

A survey of African *Opopaea* Simon, 1891 (Arachnida, Aranei, Oonopidae)

Обзор африканских пауков рода *Опораеа* Simon, 1891 (Arachnida, Aranei, Oonopidae)

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КЛЮЧЕВЫЕ СЛОВА: пауки, новый вид, новый род, новая комбинация, *Nale*.

ABSTRACT. 20 *Opopaea* species have been recognized from Africa and adjacent islands in Atlantic and Indian Oceans. All of them have been illustrated. Five species were found to be new to science: *Opopaea alje* sp.n., *O. botswana* sp.n., *O. gabon* sp.n., *O. gaborone* sp.n. and *O. sudan* sp.n.. A new genus *Nale* gen.n. was created for *O. lena* Suman, 1964 and respectively new combination have been suggested *Nale lena* (Suman, 1964) comb.n. One name, *Opopaea atlantica* (Benoit, 1977) syn.n., was synonymised with *O. concolor* (Blackwall, 1859).

РЕЗЮМЕ. В Африке и на прилежащих островах в Атлантическом и Индийском океанах выявлено 20 видов рода *Опораеа*. Все они проиллюстрированы. Пять видов описаны как новые для науки: *Опораеа алже* sp.n., *O. ботсвана* sp.n., *O. габон* sp.n., *O. габоро́не* sp.n. и *O. судан* sp.n.. Описан новый род *Нале* gen.n. для *O. лена* Suman, 1964 и соответственно установлена новая комбинация *Нале лена* (Suman, 1964) comb.n.. Один вид, *Опораеа атлантика* (Benoit, 1977) syn.n., сведён в синонимы к *O. конколор* (Blackwall, 1859).

Introduction

The Oonopidae can be still considered as a rather small family; according to Platnick [2008] it now consists of 68 genera and 491 species. Of these M. Saaristo and co-authors have described 43 species and 14 genera from Seychelles [Saaristo 2001, 2002], Socotra [Saaristo & van Harten 2002], Russian Far East [Saaristo & Marusik, 2004], Yemen [Saaristo & van Harten 2006], and Israel [Saaristo, 2007]. These reports of local faunas clearly show that apparently only a small fraction of the species of this family has been discovered and described. Also there are plenty of fossils

(about 35) which were described or reported by Wunderlich [1981, 1988, 2004], Penney [2000, 2002, 2004, 2006, 2007] and some other authors. These fossil species belong to six genera, five of which are recent and one, *Fossilopaea* Wunderlich, 1988 is extinct [Marusik & Wunderlich, 2008].

Some authors, for example Deeleman-Reinhold [1987: 56] think that “The Oonopidae are extremely numerous in the tropics, both in individuals and in species...” She also states that certain genera such as *Opopaea*, *Gamasomorpha*, *Orchestina*, and *Ischnothyreus* have a tendency to fragment into countless local forms. We agree with her opinions and add to the locally fragmented genera the genus *Lionneta* which seems to be endemic to Seychelles [Saaristo, 2001]. The last mentioned phenomenon is opposed by the fact that there are several vastly distributed species like i.e. *Opopaea deserticola* Simon, 1891, *Opopaea concolor* (Blackwall, 1859), *Pelicanus marmoratus* Simon, 1891, *Brignolia cubana* Dumitresco & Georgesco, 1983, and *Ischnothyreus peltifer* (Simon, 1891). These species occur on far distant islands and places and demonstrate no morphological differences visible through the regular or scanning electron microscope.

In this paper we review the African species belonging to one of the most species rich genus in the Oonopidae, viz *Opopaea* Simon, 1891. It consists of 45 described species [cf. Platnick, 2008; Saaristo, 2007] distributed in tropical and subtropical regions of the Old and New World. Most of the species of this genus are distributed in continental Africa and adjacent islands. The goal of this paper was not a revision of all available identified and unidentified material stored in different museums, but just a review of specimens identified by earlier authors as *Opopaea*, *Gamasomorpha* and some other genera. On the other hand, due to the revisions of the Seychellois, Yemeni, and Israeli spe-

cies of the Oonopidae it became a necessity to check most of the African *Opopaea* species which give rise to this paper. During our studies we recognized in Africa 20 species belonging to the genus *Opopaea*. Five of them are new to science. One species *Opopaea atlantica* (Benoit, 1977) is found to be *ad partem* synonym of *O. concolor* (Blackwall, 1859) and *ad partem* synonym of *O. deserticola* Simon, 1891. Further one new genus, namely *Nale* gen.n. for an ex. *Opopaea*, viz. *Opopaea lena* Suman, 1964 is described. All species which are reported in this paper are described and figured.

List of the species & sexes included:

01. ♂ *O. alje* sp.n. — Tanzania (Paris, AR 5686).
02. ♂ & ♀ *O. berlandi* (Simon & Fage, 1922) — Kenya (Paris ?, types not seen).
03. ♂ & ♀ *O. botswana* sp.n. — Botswana (MZT AA 3.032A & B).
04. ♂ & ♀ *O. concolor* (Blackwall, 1859) — Madeira, Canary Is. (MZT AA 3.653 & 3.050; Yemen; AA 3.075 Cap Verde).
05. ♂ & ♀ *O. deserticola* Simon, 1891 — Pantropical (MZT).
06. ♀ *O. gabon* sp.n. — Gabon (Paris AR 5733).
07. ♂ & ♀ *O. gaborone* sp.n. — Botswana (AA 3.081).
08. ♂ & ♀ *O. hoplites* (Berland, 1914) — Kenya (Paris AR 5671).
09. ♂ & ♀ *O. kulczynskii* (Berland, 1914) — Kenya (Paris AR 5676).
10. ♀ *O. margaritae* (Denis, 1947) — Egypt (Paris ?; types not seen).
11. ♂ & ♀ *O. mattica* Simon, 1893 — Cape Town (Paris AR 5745).
12. ♀ *O. probosciella* Saaristo, 2001 — Seychelles (ZMMU).
13. ♂ & ♀ *O. punctata* (O. P.–Cambr., 1872) — Lebanon, Israel (MZT).
14. ♂ *O. santschii* Brignoli, 1974 — Tunisia & Yemen (Paris AR 5746 ♂, MZT).
15. ♂ & ♀ *O. silhouettei* (Benoit, 1979) — Seychelles, Rapa Nui (MZT).
16. ♂ & ♀ *O. simoni* (Berland, 1914) — Kenya (Paris ?, London?, type not seen).
17. ♂ *O. speciosa* (Lawrence, 1952) — Natal (Paris?; type not seen).
18. ♂ & ♀ *O. sudan* sp.n. — Sudan (MRAC).
19. ♀ *O. suspecta* Saaristo, 2003 — Seychelles (ZMMU, ♀ type).
20. ♂ & ♀ *Nale lena* (Suman, 1965) — OW tropics (MZT, many).

Material and methods

Figures of each particular species were made at different times, so the style of the pictures differs slightly. Digital photographs were made only for these species/specimens that were kept in Turku. Specimens were

photographed using an Olympus SZX12 stereomicroscope and Olympus Camedia C-5050 camera. The images have been montaged using “CombineZM” image stacking software. SEM-microphotographs were made with a JEOL JSM-5200 in the Zoological Museum, University of Turku. All measurements are given in mm.

Abbreviations

Museums: MNHN — Muséum National d’Histoire Naturelle, France; MZT — Zoological Museum, Turku, Finland; ZMMU — Zoological Museum of the Moscow University, Russia; MRAC — Musée Royal de l’Afrique Centrale, Tervuren, Belgium.

Morphological terms: AS — Anterior (=epigastral) scutum; BL — Bulbal lobe; BR — Bulbal ridge; CO — Cove (=arch) between RB; EF — Epigastric furrow; FE — Femur; FH — Feathery hairs of RB; FO — Finger-like outgrowth of male chelicera; GO — Male gonopore; IF — Intercostal furrow; LA — Lateral apodema; OP — Opercula; OO — Outgrowths around bulbal opening; PA — Patella; PB — Psebolus; PD — Postgynal depression; PG — Postgynum; PE — Extension of petiolar tube; PM — Parmula; PO — Pocket between carapace and sternum; PR — Postgynal ridge; PS — Posterior scutum; PT — Petiolar tube; PW — Palpal fenestra; RB — Boomerang ridges of scutopetiole apparatus; SH — Sluice; SL — Sluice; SR — Stridulating ridges; Ti — Tibia; TR — Trochanter; TS — Tracheal spiracle.

Measurements: CL — Carapace length; CW — Carapace width; DSI — Dorsal abdominal scutum length; DSW — Dorsal abdominal scutum width; Ti I — Tibia I length; TL — Total length.

Indexes: BBI — Ratio of cymbiobulbus width to its height; CI — Ratio of carapace width to length; CSI — Ratio of carapace length to dorsal scutum length; FEI — Ratio of femur IV length to carapace length; LLI — Ratio of tibia I length to carapace length; OI — Ratio of opercula length to width of petiolar tube; PBI — Ratio of cymbiobulbus width to psebolus length; PGI — Ratio of postgynum width to postgynum length; PPI — Ratio of male palpal patella width to its length.

Genus *Opopaea* Simon, 1891

Opopaea Simon, 1891: 560. Type species by monotypy *Opopaea deserticola* Simon, 1891 from Lesser Antilles, Windward Islands, St. Vincent.

DIAGNOSIS. From other scutate oonopids (= Oonopidae loricatae) this genus can be easily separated by having fenestra on the male cymbiobulbus. Females of this genus can be distinguished from most of scutate oonopids by large dorsal scutum covering more than 4/5 of abdomen, presence of scutopetiole apparatus, lack of abdominal pattern and shape of postgynum.

DESCRIPTION. Yellow to light brown small (1.25–2.5) oonopids without pattern. Sexual dimorphism poorly developed, females slightly larger than males.

Carapace pear-shaped, longer than wide (width/length ratio from 0.76 to 0.87), dorsal side not domed, parallel to

lateral margins (Fig. 155) posterior slope steep, margins with distinct sluice. Sides with about 15–20 fine longitudinal ridges, some of ridges are broken, they are partially fused and form kind of grids (reticulation). Most lateral ridges are separated from the sluice by an unridged band carrying a row of strong forwardly directed setae with hemispherical bases. Dorsal side of carapace flat and bold (smooth) without microsculpture (Figs 81, 105). Lateral sides of bold area with relatively strong and long setae directed medially (as in Fig. 170), posterior side of bold area with 2–4 pairs of setae directed forward-medially (Figs 90, 213). Median part of slope bold. Terminal part of ridges form dot-like outgrowths above the slope sluice (as in Fig. 156). Posterior part of sluice thicker than lateral and form kind of arch above petiolus (Fig. 156). Space between posterior sluice and petiolus with several transverse ridges, possibly playing a stridulatory role. There are two pockets below the lateral sides of the sluice arch (Fig. 156). Edge of clypeus with 2–3 pairs of strong forwardly directed setae (Figs 29, 105, 155, 186, 196).

Eyes forming compact group. Lateral eyes touching median. Median eyes are the largest, except in *O. sillhouttei* and *O. sudan*. sp.n. which have anterior lateral eyes larger than others.

Sternum shield-like (Figs 25, 139, 198–204), extending between coxae and turning behind the carapace. Sternum and carapace form a kind of capsule. Sternum with intercoxal radial furrows formed by 4–6 pits arranged in one line. Opposite to each coxa there is a longitudinal furrow on sternum with two depressions (pits) on opposite sides of furrow (Fig. 139). Posterior part of sternum with semicircular depression around the petiolus.

Mouth parts. Chelicerae unmodified, without teeth. Male maxillae modified with triangle or finger-like outgrowth in terminal part. Labium trapezoidal, rebordered.

Abdomen with dorsal and ventral scuta. Dorsal scutum covers whole abdomen in males, and almost whole or whole dorsum in females. Female with four ventral scuta: epigastral (=anterior), small transversal postgynal (=postepigastral), large abdominal (=posterior) and small ring-like inframmillar scutum around spinnerets. Male with two ventral scuta. One formed by three fused scuta (anterior-postgynal-posterior) and inframmillar (Fig. 144). Both sexes have pair of lateral apodema lying aside of genital area (Figs 5, 12, 16–17, 121, 198, 203, 223–236). Epigastral (anterior) scutum with scutopetiolar apparatus: petiolar tube thickened on the top, thickened part bears two dorsolateral extensions (outgrowth) semiround-triangular in shape; terminal part of epigastral scutum with pair of more or less boomerang-shaped ridges. These ridges are connected with more or less developed cove (arch). Ridges covered with specialised feathery hairs. Shape of petiolar tube extensions, curve of ridges and cove are equal in both sexes and species specific.

Male ventral scutum with distinct round gonopore (Figs 143–145) placed in the centre of epigstric “furrow”.

Legs. Relatively short, spineless, leg formula IV:I:II:III. Femur IV/ carapace length ratio vary from 0.59 to 0.81.

Female palp. Relatively short and thick. Patella subequal in size to tibia (Figs 52, 71, 155). Terminal segment with modified thick hairs on the tip (Figs 52, 106). Terminal segment fairly large, subequal in length to femur and can be partially swollen (*O. suspecta*).

Male palp. Male palp with small and thin femur (thinner than all other segments). Patella strongly enlarged 1.5–2

times longer than femur, and as long as tibia+bulbus, usually oval shaped but can be conical also. Femur attached to patella at posterior 1/3. Tibia smaller than other segments, as long as wide. Cymbium totally fused with bulbus and these two parts form a cymbiobulbus. Cymbiobulbus about 2–3 longer than wide. There are no trace of fusion. Cymbial part can be recognised by hairs only. There are no difference in cuticle microstructure of cymbial and bulbal parts. Bulbal part always has a fenestra (=window) in dorso-terminal part (a pocket like depression on the prolateral part with thin transparent wall). Bulbal (embolus) opening is in terminal part of cymbiobulbus. Opening is rather large, round or oval shaped. It is usually surrounded with two prolaterally directed outgrowths (Figs 128, 164). One of two outgrowths can be almost reduced (Figs 151) or one can be strongly developed (Fig. 164). Cymbiobulbus can carry ridges (Fig. 123), and almost always has round retrolateral lobe (Fig. 123). Bulbus has no seminal duct inside, but only sinus (Figs 119–120, 122) like all other Oonopidae (except *Orchestina* and related genera). Cymbiobulbus length/width ratio, shape of fenestra, shape and size of outgrowth around bulbal opening, presence of accessorial ridges are species specific.

Female copulatory organ restricted to postgynum (postgynal transversal scutum lying between tracheal spiracles). Postgynum lies immediately behind the epigastric furrow and consists of a more or less triangular median depression or postgynal depression. Anterior edge of the postgynal depression is formed by a wider or shallower sheet-like scutal ridge; in the middle of the under side of this ridge there is a knob-like posterior pointing extension or parmula. The shape and location of parmula is very variable; it can look like a small prickle standing on the bottom of the median depression or otherwise. Postgynal dimensions are as follows: width = distance between the lateral apodema, length = distance between epigastric groove and the shallow groove connecting tracheal spiracles; postgynal index (PGI) = width/length of postgynum. Shape of depression and parmula are species specific.

Species specific characters are summarised below: 1) Proportions of the male palp (relative size of patella, femur, cymbiobulbus); 2) Shape of cymbiobulbus (fenestra, terminal outgrowth, lobe); 3) Place of femur attachment to patella; 4) Shape of patella (*gaborone*); 5) Scutopetiolar apparatus (curvature of boomerang-shaped ridges, deepness of cove, etc.); 6) Shape of petiolar tube (*gaborone*); 7) Size and thickness of hairs (on the body and on the cymbial part of the male palp); 8) Shape of proportions of postgynum (parmula, postgynal depression, etc.).

Possibly number of stridulating ridges are also species specific, as well as number longitudinal ridges on carapace sides.

SPECULATIONS. That the patella is strongly enlarged seems to be because it plays an important role in copulation. It is full of muscles (Figs 120, 122). The tibia strongly reduced maybe because of the fusion of cymbium and bulbus, so the tibial muscles and tendons that move the cymbium are reduced. So, the massive muscles of the patella and their tendons are responsible for moving a large cymbiobulbus. Other oonopids with fused cymbium and bulbus have a much smaller cymbiobulbus, and therefore need no large patella.

DISTRIBUTION. Members of this genus have a pan-tropical distribution and are known from USA to Argentina in America, all of Africa, Israel, Arabian Peninsula, Sri-Lanka, from southern China to Australia.

Survey of species

Opopaea alje sp.n.

Figs 1–7, 189.

TYPE MATERIAL. Holotype ♂ from “Afr. Or. Allemagne: Kilimanjaro (Bismarckhügel), Alluaud & Jeannel leg., st. 70 (IV/1912) M. Saaristo det 2003 (ex. *Gamasomorpha simoni* Berland)” = Tanzania, Kilimanjaro. MNHN, Paris AR 14422/523.

ETYMOLOGY. The specific name is arbitrary combination of letters.

DIAGNOSIS. Male (female unknown) is diagnosed by having the cymbiobulbus clearly longer than fairly well plumped patella, femur exceptionally large, more than 2/3 of the size of patella (Fig. 1). Cymbiobulbus is evenly narrowing apically from the site of the fenestra (Figs 1–2).

DESCRIPTION. Carapace and abdomen orange-brown, legs and palps pale, lighter than the body. Maxillae with small outgrowth. Operculae small, elongate. Petiolar tube rather short with heavily sclerotized basal ring (Fig. 4). Anterior and median eyes subequal in size and large than posterior eyes. Cymbiobulbus fairly large 1.3 times longer than patella, and patella about 1.3 times longer than femur. Fenestra about twice longer than high. Psemبولus without distinct outgrowths.

MEASUREMENTS. TL 1.79, CL 0.72, CW 0.59, DSL 1.0, DSW 0.64, TiI 0.3, FeIV 0.54, LO 0.07, CI 0.8, DSI 0.64, CSI 0.73, LLI 0.41, FEI 0.75.

DISTRIBUTION. Tanzania.

Opopaea berlandi (Simon & Fage, 1922)

Figs 8–10.

Gamasomorpha berlandi Simon & Fage, 1922: 535, f. 4.4–6 (D ♂ & ♀).

Opopaea berlandi: Brignoli, 1975: 230 (T from *Gamasomorpha*).

MATERIAL. None.

DIAGNOSIS. Male is diagnosed by the truncate cymbiobulbus which is half the size of the large, plump patella.

DESCRIPTION. Detailed illustrated descriptions of male are given in Simon & Fage [1922] and Brignoli [1975], but no figures were provided of the female. Total length about 1 mm. Palpal patella very large, 1.37 longer and twice wider than cymbiobulbus and twice longer than palpal femur (Fig. 8).

DISTRIBUTION. East Africa.

Opopaea botswana sp.n.

Figs 11–12, 192, 220, 231.

TYPE MATERIAL. Holotype ♀ and paratype ♂: BOTSWANA, South distr., Gaborone, dry sand with *Acacia* litter, 10.07.–10.09.1973, Reijo Hakanen. (MZT AA 3.032). Paratype male with only one broken palp.

ETYMOLOGY. Specific name derived from the country of distribution.

DIAGNOSIS. Male palp similar as usual in *Opopaea*; cymbiobulbus somewhat shorter than patella; relatively evenly narrowing apically, and apex pointing anterodorsally; fenestra rather long and very low, pointed at both ends. Postgynum of female narrow and short; PGI = ca. 2.29. Postgynal depression is about semicircle, knob-like parmula hanging from the scutal ridge (Fig. 12).

Postgynum of *O. botswana* sp.n. is similar to those in *O. mattica* in size and parmula, but it can be easily distinguished by large depression (as wide as distance between apodema).

DESCRIPTION. Palpal patella subequal in size to cymbiobulbus, and 1.8 longer than palpal femur (Fig. 11A). Mid-part of cymbiobulbus with lump-like outgrowth (Fig. 11). Terminal part of cymbiobulbus simple, unmodified, without distinct outgrowths, it carries a small ridge close to fenestra (Fig. 11A). Postgynum with distinct parmula (Fig. 12) and small depression.

MEASUREMENTS. Male: TL 1.29, CL 0.6, CW 0.46, DSL 0.81, DSW 0.50, TiI 0.29, FeIV 0.43, CI 0.76, DSI 0.61, CSI 0.74, FEI 0.72, LLI 0.48. Female: TL 1.57, CL 0.66, CW 0.49, CH 0.26, DSL 1.0, DSW 0.66, TiI 0.29, FeIV 0.5, CI 0.74, CHI 0.39, DSI 0.66, CSI 0.66, FEI 0.76, LLI 0.43.

Comments. Female was chosen as a holotype because the single male palp was broken

DISTRIBUTION. Botswana.

Opopaea concolor (Blackwall, 1859)

Figs 13–20, 119–121, 123–132, 193, 199, 218, 228.

Oonops concolor Blackwall, 1859: 265 (D ♂ & ♀).

Opopaea concolor: Kulczyński, 1899: 339, pl. 6, f. 25.

Gamasomorpha atlantica Benoit, 1977: 35, f. 13a–e (D ♂ & ♀). **New synonymy.**

Opopaea atlantica: Brignoli, 1983: 188 (T ♂ & ♀ from *Gamasomorpha*).

O. c.: Wunderlich, 1987: 63, f. 24–26 (♂ & ♀).

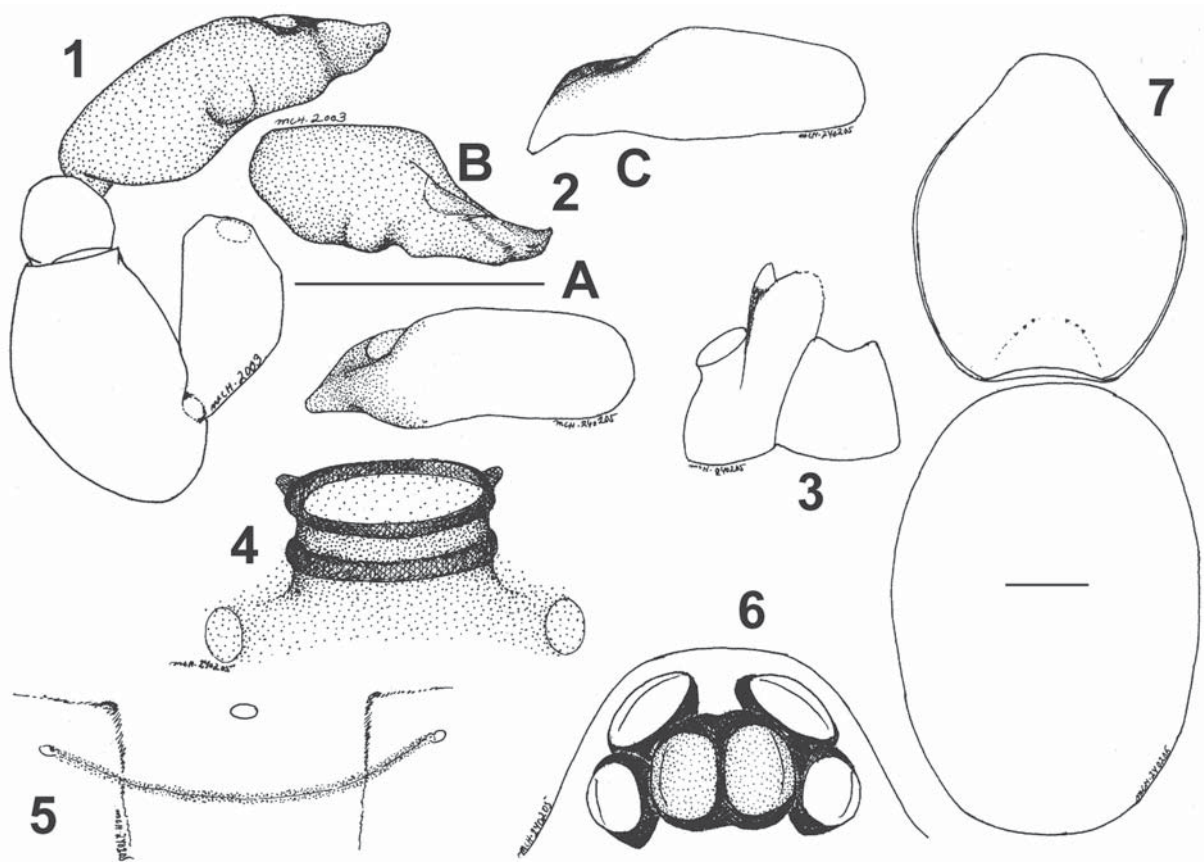
O. c.: Saaristo, 2001: 333, f. 88B–93B (♂ & ♀).

O. c.: Saaristo & van Harten, 2006: 137, f. 22, 23a–b, 24a–b, 25a–b, 26a–b, 27 (♂ & ♀).

MATERIAL. CANARY ISLANDS: Gran Canaria: near San Agostin, 2 ♂♂, 1 ♀, July 1988, J. Wunderlich leg. (SMF 36969), La Palma: near Santa Cruz, 1 ♀, July 1988, J. Wunderlich leg. (SMF 36970). CAPE VERDE ISLANDS: Santiago: São Jorge dos Orgãos, 1 ♂, 17–30.12.1999, A. van Harten leg. (MZT AA 3.075). ST HELENE, Prosperous Bay Plain, 1000–1100 ft, ♂ holotype and ♀ allotype of *O. atlantica*, 05.–06.05.1967, J. Decelle & J. Leleup leg. (MRAC 133.356) and ♂ paratype of *O. atlantica*, 29.04.1967, J. Decelle & J. Leleup leg. (MRAC 133.392), Varneys, ♀ paratype of *O. atlantica*, 13.03.1966, A. Loveridge leg. (MRAC 133.494), Great Stone Top, ♀ paratype of *O. atlantica*, 18.04.1967, J. Decelle & J. Leleup leg. (MRAC 133.467). BOTSWANA, South distr., Gaborone, dry sand with *Acacia* litter, 10.07.–10.09.1973, Reijo Hakanen leg. 1 ♀ (MZT AA 3.032). YEMEN: ar-Rujum, Malaise trap, 1 ♂, 1 ♀, 24.07.–17.09.2001, A. van Harten leg. (MZT AA 3.653); near Hammam ‘Ali, 1 ♀, 29.05.2000, A. van Harten leg. (MZT AA 3.050).

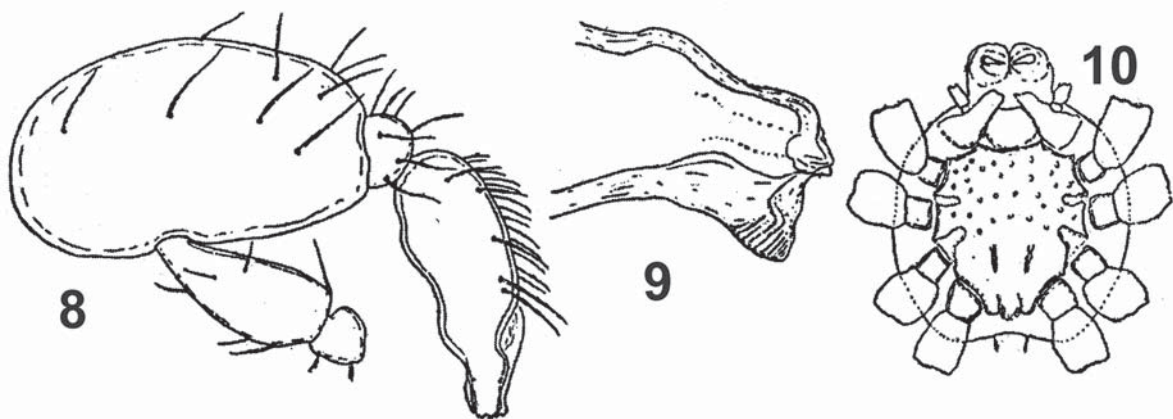
DIAGNOSIS. The male of *O. concolor* can be distinguished by the strong, frontally pointing finger-like apicodorsal extension of the psemبولus and the small sharp-pointed, ventral protuberance on the border of the bulbus and psemبولus (Figs 14A, 123–128, arrows) and the female by the black, short, blunt-tipped parmula close to the posterior edge of roughly triangular postgynal depression (Figs 16–17, 129–130).

DESCRIPTION. Male. Body and male palps light orange, legs pale orange. Sides of carapace covered with longitudinal streaks, dorsal plane smooth, shiny. Anterior eyes slightly larger than PMEs, about 1/3 of their diameter apart, PLMs ca. half of size of PMEs (Fig. 19). Sternum with well distinguished radial furrows. Anterior end of maxillae with shortish, blunt-tipped projection (Figs 21, 127). Dorsal scutum ovoid densely covered with short, subdecumbent hairs arising from small pits. Scutopetiolar apparatus well-developed (Figs 18, 132), scutal cove reach the frontal edge of the anterior scutum; opercula oval-shaped, fairly large, OI = 0.4 (Fig. 18). Sperm pore (=gonopore) well discernable, transverse (Fig. 20). Patella of male palp is equal in size to



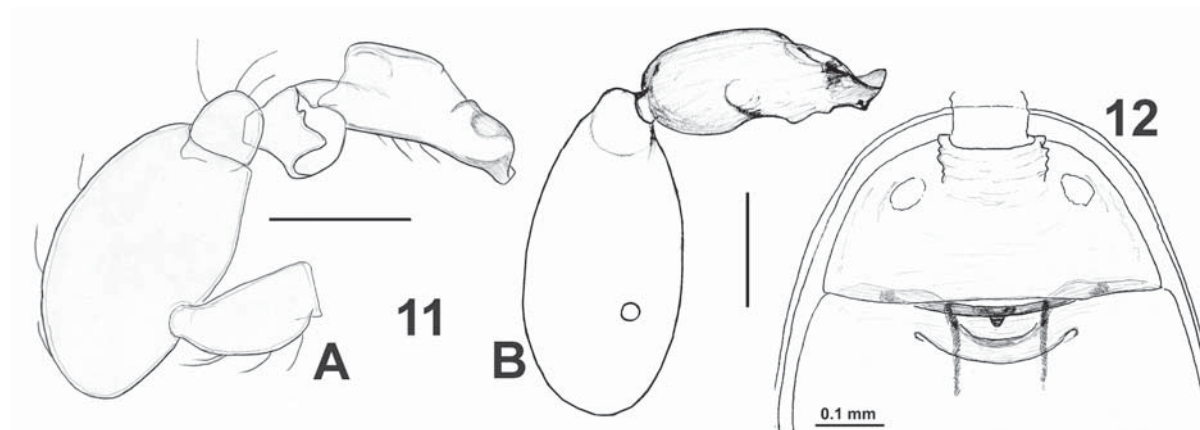
Figs 1–7. *Opopaea alje* sp.n.: 1 — right male palp, lateral; 2 — left cymbiobulbus, lateral (A), dorsal (B), and ventral (C); 3 — right maxilla and labium, ventral; 4 — petiolar tube and operculae, ventral; 5 — gonopore, ventral; 6 — eyes; 7 — carapace (eyes not shown) and abdomen, dorsal. Scale bars: 0.2 mm. Orig.

Рис. 1–7. *Opopaea alje* sp.n.: 1 — правый палец самца, сбоку; 2 — левый цимбиобульбус, сбоку (А), сверху (В), и снизу (С); 3 — правая максиллы и лабиум, снизу; 4 — трубка стебелька и лёгочная крышка, снизу; 5 — гонопор, снизу; 6 — глаза; 7 — карапакс (глаза не показаны) и брюшко, сверху. Масштаб: 0,2 мм. Ориг.



Figs 8–10. *Opopaea berlandi* (Simon & Fage, 1922): 8 — left male palp, lateral; 9 — apex of the bulb; 10 — prosoma, ventral. After Simon & Fage [1922].

Рис. 8–10. *Opopaea berlandi* (Simon & Fage, 1922): 8 — левый палец самца, сбоку; 9 — вершина бульбуса; 10 — просома, снизу. По Simon & Fage [1922].



Figs 11–12. *Opopaea botswana* sp.n.: 11 — male palp, lateral (A — paratype; B — lost palp, illustrated long time ago); 12 — upper part of female abdomen, ventral. Scale: 0.1 mm. Orig.

Рис. 11–12. *Opopaea botswana* sp.n.: 11 — палец самца, сбоку (A — паратип; B — утерянный палец, нарисован давно); 12 — верхняя часть брюшка самки, снизу. Масштаб: 0,1 мм. Ориг.

cymbiobulbus, and twice longer than femur (Fig. 13). Cymbiobulbus narrowing apically, with characteristic small, finger-like apicodorsal extension. (Figs 14, 125).

Female like male except maxillae without projection. Posterior edge of roughly triangular postgynal depression strongly notched; parmula black, short, blunt-tipped (Figs 16–17, 129–130).

MEASUREMENTS. Male: TL 1.25, CL 0.54, CW 0.43, DSL 0.71, DSW 0.51, TiI 0.21, CI 0.80, DSI 0.70, CSI 0.75, LLI 0.40. — Female: TL 1.41, CL 0.55, CW 0.45, DSL 0.86, DSW 0.61, TiI 0.21, CI 0.81, DSI 0.71, CSI 0.65, LLI 0.40.

DISTRIBUTION. Yemen, Madeira, Canary Islands, St. Helene (as *O. atlantica*), Cape Verde Islands and Botswana.

Opopaea deserticola Simon, 1891

Figs 22–29, 137–146, 178, 194, 200, 210, 219, 226.

Opopaea deserticola Simon, 1891: 560, Pl. 42, f. 5 (D ♂ & ♀).

Opopaea darlington Bryant, 1940: 267, f. 5, 7 (D ♂)

Opopaea brasima Chickering, 1969: 148, f. 4–10 (D ♂ & ♀).

O. d.: Dumitresco & Georgesco, 1983: 103, Pl. 21, f. 1–6 (♂ & ♀, removed from S of *O. punctata*, S = *darlington* = *brasima*).

O. d.: Saaristo, 2001: 333, f. 93A–98A, 99–101 (♂ & ♀).

MATERIAL. SEYCHELLES: Amirantes, Poivre Atoll, 1♀, 05.–09.08.1984, coll. USSR. Zool. Exped. (ZMMU); Assumption Atoll, 2 ♀♀, 12.–14.08.1984, coll. USSR. Zool. Exped. (ZMMU); Bird, 1♀, sweeping, March 2000, coll. BirdLife (MZT AA 1.587); Cousin, under *Eucalyptus* bark, 1 ♀, 21.04.1978, Hugh Watkins leg. (MZT AA 0.066); Cousine, 1 ♀, 23.03.1998, J. Kelly leg. (MZT AA 1.276); Farquar Atoll, 1 ♀, 16.–19.08.1984, coll. USSR. Zool. Exped. (ZMMU). ST HELENE, Rupert's Valley sur *Suaeda frutescens*, 5 males paratypes of *O. atlantica*, 27.04.1967, J. Decelle & J. Leleup (MRAC 133.417), Rupert's Valley 1 ♀ paratype of *O. atlantica*, 07.03.1967, J. Decelle & J. Leleup (MRAC 133.360), Rupert's Valley 2 ♀♀ paratypes of *O. atlantica*, 04.12.1965, P. Basilevsky, P. Benoit & J. Leleup (MRAC 129.306). TONGA: Tongatapu, 1 ♂, P. T. Lehtinen leg. (MZT AA 3.318). TOAMOTU ISLANDS: 1 ♂, 1 ♀, P. T. Lehtinen leg. (MZT AA 3.315). W. SAMOA, Savai'i, 1 ♂, P. T. Lehtinen leg. (MZT AA 3.319).

DIAGNOSIS. Male of *O. deserticola* can be recognized by the conspicuous excavation on the ventral side of the cymbiobulbus and by its lightly serrate, inwards pointing apex and the female by having, immediately behind the

epigastric furrow, a median, posteriorly pointing, darkish triangular figure with a small dark spot in the middle of its anterior edge.

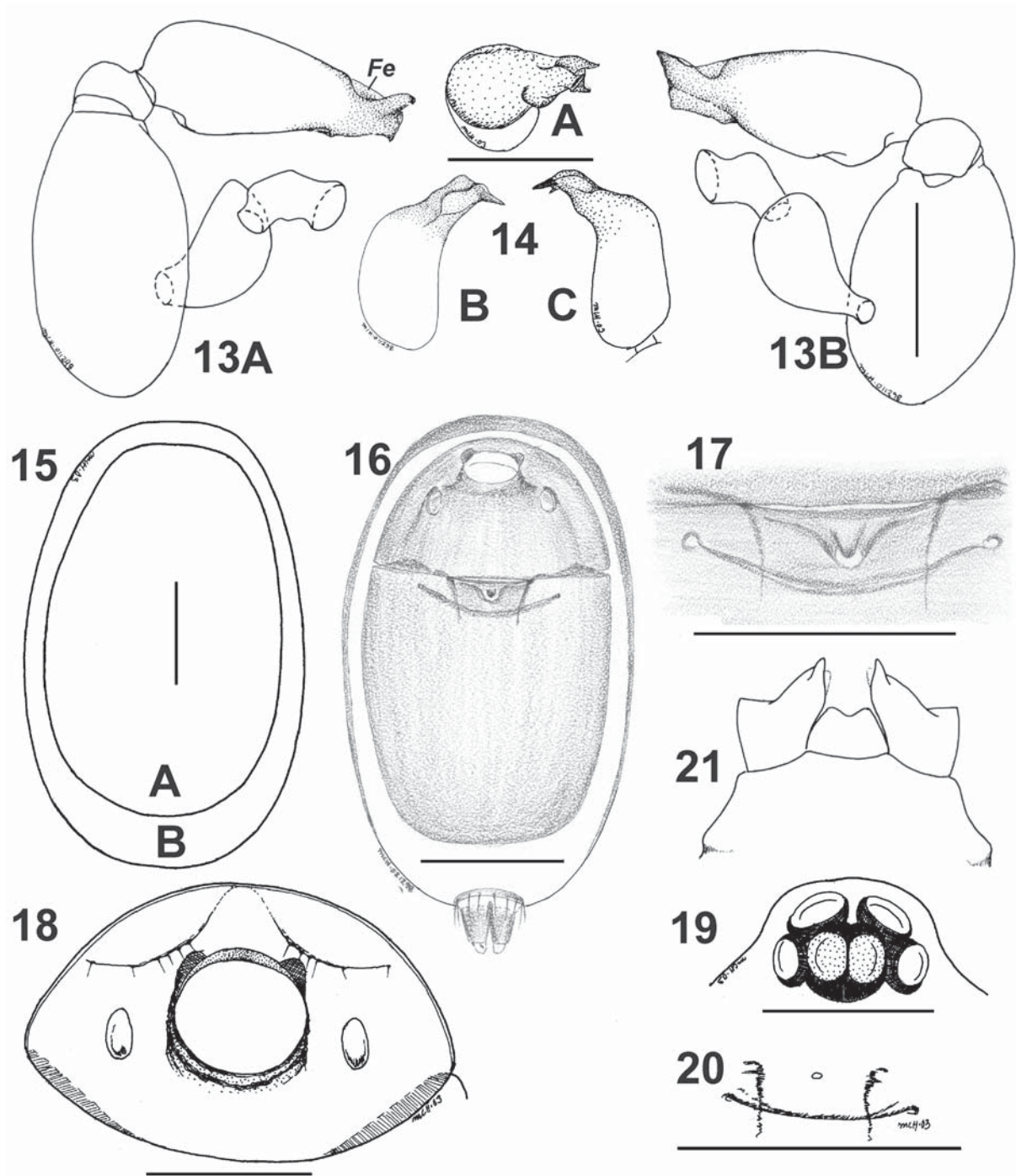
DESCRIPTION. Small (TL = 1.26–1.40, CL = 0.53–0.54), light brown species with pale yellow legs. Male palps coloured as carapace. Sides of carapace covered with longitudinal streaks, dorsal plane smooth, shiny. Three, sometimes four strong upstanding hairs at posterior border of dorsal plane and row mesially pointing rather short hairs at lateral edges. Sternum with well distinguished radial furrows (Figs 25, 139). Anterior ends of male maxillae with strong, tooth-like projections (Figs 25, 141). Dorsal scutum ovoid densely covered with short, subdecumbent hairs arising from small pits. Legs short, thick (Fig. 178). Opercula small, oval shaped (Figs 26–27, 144). Dorsolateral corners of petiolar tube drawn into triangular lobes that have small counterparts on ventral scutum. Sperm pore (=gonopore) of male clearly discernible, transverse (Figs 27–28, 144). Posterior ring well developed. Colulus very small with two hairs. Male and female similar but female somewhat larger and abdomen of female relatively much larger than that of male; CI = 0.87–0.81, DSI = 0.62–0.71, LLI = 0.33–0.31, CSI = 0.71–0.67. Palpal patella equal in size to cymbiobulbus and 1.5 longer than palpal femur (Fig. 22). Apical part of bulbus fairly short, ca. one third of rest of bulbus, compact but rather complicated. Club-like femur appreciably large, inserted with patella at its middle (Figs 137–138). Epigastric area of female with darkish triangular, posteriorly pointing depression bearing in middle of its anterior small dark spot or very small parmula, sometimes almost hidden under narrow scutal ridge (Figs 24, 145).

DISTRIBUTION. New to St. Helena, Tonga, Toamotu Islands, and W. Samoa. Previously the species has been recorded from Cuba, Florida, St. Vincent, and Seychelles [Saaristo, 2002].

Opopaea gabon sp.n.

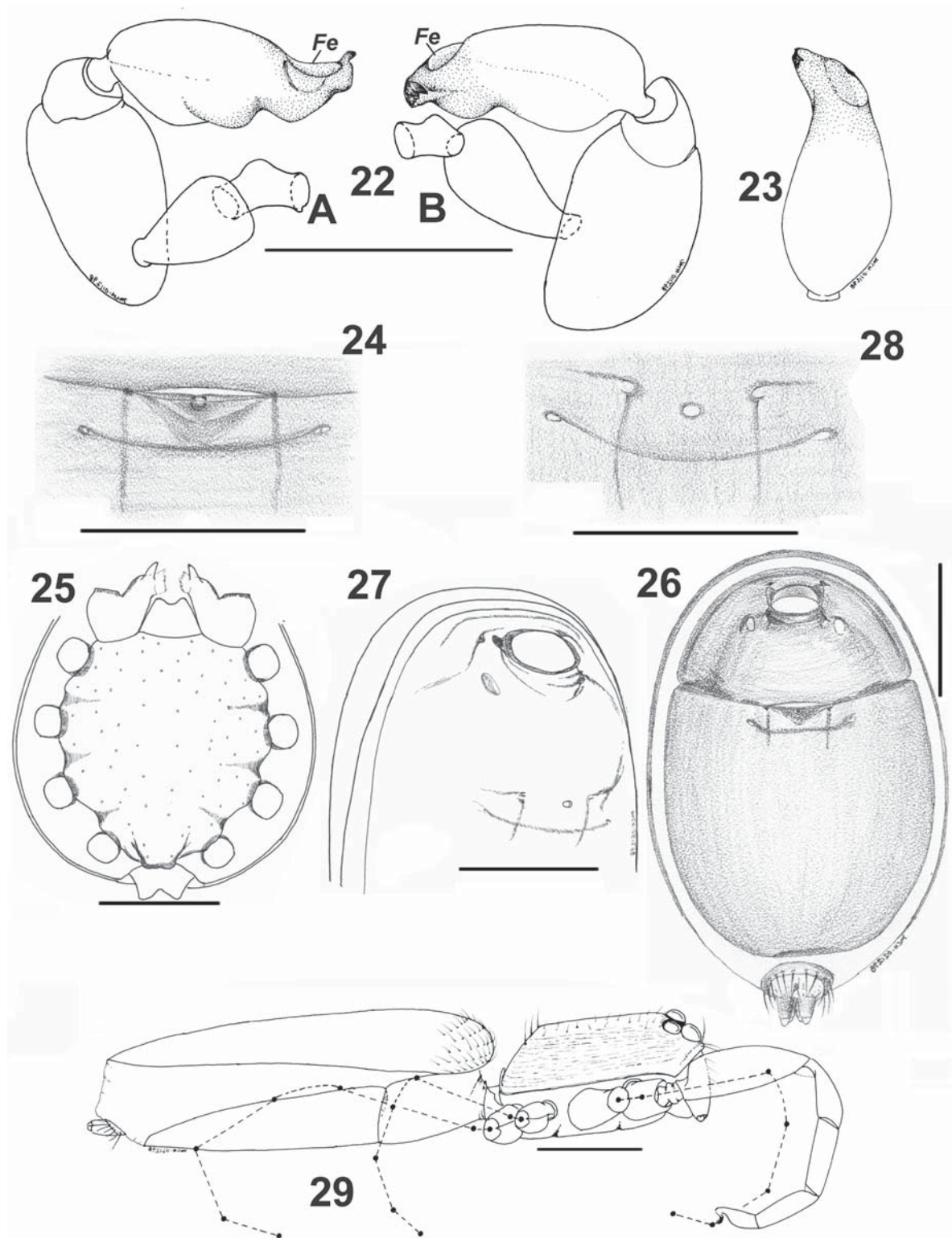
Figs 30–33, 214, 223.

TYPE MATERIAL. Holotype ♀: “Gabon (Mq)”, (MNHN AR 5733/ 526) which belongs to the original type material (type series) of *O. mattica*.



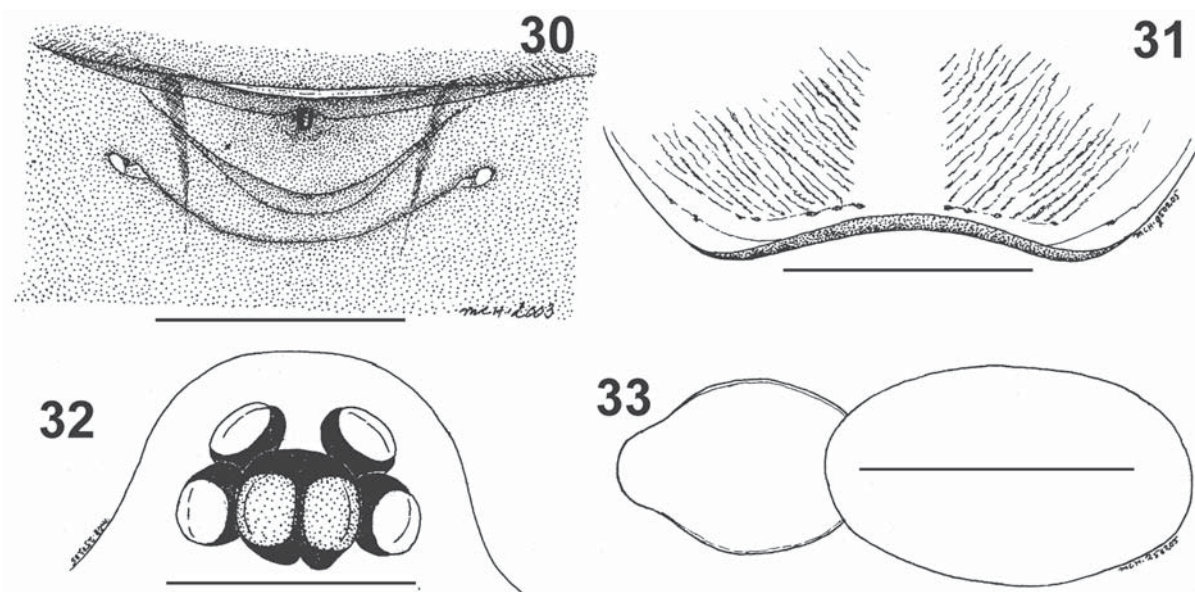
Figs 13–21. *Opopaea concolor* (Blackwall, 1859): 13 — male palp, lateral (A) and medial (B); 14 — cymbiobulbus frontal (A), dorsal (B), and ventral (C); 15 — contours of abdomen of male (A) and female (B); 16 — abdomen of female, ventral; 17 — postgynum; 18 — scutopetiolar apparatus; 19 — eyes of female; 20 — epigastric area of male; 21 — maxillae and labium of male, ventral. Scale bars: 13, 14 — 0.1 mm; 15–21 — 0.2 mm. Orig.

Рис. 13–21. *Opopaea concolor* (Blackwall, 1859): 13 — палец самца, сбоку (A) и medial (B); 14 — цимбиобульбус, спереди (A), сверху (B), и снизу (C); 15 — абрис брюшка самца (A) и самки (B); 16 — брюшко самки, снизу; 17 — постгинум; 18 — скутопетиолярный аппарат; 19 — глаза самки; 20 — эпигастральная область самца; 21 — максиллы и лабиум самца, снизу. Масштаб: 13,14 — 0,1 мм, 15–21 — 0,2 мм. Ориг.



Figs 22–29. *Opopaea deserticola* Simon, 1891: 22 — male left palp, prolateral (A) and retrolateral (B); 23 — left cymbiobulbus dorsal; 24 — postgynum ventral; 25 — cephalothorax of male, ventral; 26 — abdomen of female, ventral; 27 — anterior part of male abdomen obliquely ventral; 28 — epigastric area of male, ventral; 29 — female, lateral. Scale bars: 22–28 — 0.2 mm; 29 — 0.5 mm. Orig.

Рис. 22–29. *Opopaea deserticola* Simon, 1891: 22 — левый палец самца, пролатерально (А) и ретролатерально (В); 23 — левый цимбиобульбус сверху; 24 — постгинум снизу; 25 — головогрудь самца, снизу; 26 — брюшко самки, снизу; 27 — передняя часть брюшка самца снизу; 28 — эпигастральная область самца, снизу; 29 — самка, сбоку. Масштаб: 22–28 — 0,2 мм; 29 — 0,5 мм. Ориг.



Figs 30–33. *Opopaea gabon* sp.n.: 30 — postgynum, ventral; 31 — posterior edge of carapace; 32 — eyes, dorsal; 33 — carapace (eyes not shown) and abdomen, dorsal. Scale bars: 30–32 — 0.2 mm; 33 — 1.0 mm. Orig.

Рис. 30–33. *Opopaea gabon* sp.n.: 30 — постгинум, снизу; 31 — задняя часть головогруды; 32 — глаза, сверху; 33 — карапакс (глаза не показаны) и брюшко, сверху. Масштаб: 30–32 — 0,2 мм; 33 — 1,0 мм. Ориг.

ETYMOLOGY. Specific name derived from the country of distribution.

DIAGNOSIS. Female (male unknown) can be recognised by the large rectangular postgynum, PGI = 1.60. Lateral eyes equal in size and somewhat smaller than median (Fig. 32). Scutal ridge relatively narrow with small median elongated knob-like parmula standing on a shallow dimple; postgynal depression wide semicircular (Fig. 30).

DESCRIPTION. TL ca 2.08. CL 0.8, CW 0.63, CH 0.32, CI 0.79, DSL 1.32, DSW 0.79, FeIV 0.56, LO 0.065, PW 0.21, FEI 0.7.

DISTRIBUTION. Only type locality.

Opopaea gaborone sp.n.

Figs 107–111, 147–154, 188, 205, 213, 224.

TYPE MATERIAL. Holotype ♂ and paratypes 2 ♂♂, 6 ♀♀ and 16 juvs.: BOTSWANA, South distr., Gaborone, dry sand with *Acacia* litter, 10.07.–10.09.1973, Reijo Hakanen leg. (MZT AA 3.081).

ETYMOLOGY. Specific name derived from the type locality.

DIAGNOSIS. Male of this species can be easily recognised by conical posterior (proximal) half of palpal patella (Figs 107–109, 147–148, 207) which is unique for the genus. Females can be recognized by lack of parmula, presence of fine pit on postgynal plate, and small hollow on petiolar tube (Figs 110–111, 154).

DESCRIPTION. Brown orange, male palps lighter than carapace, and legs slightly lighter than palps. Legs relatively long (Fig. 152). Petiolar tube has well developed extensions but ridges of ventral scutum poorly developed and almost horizontal (Fig. 153). Petiolar tube with small hollow on ventral side in both sexes and in all specimens (Fig. 154). Cymbiobulbus equal in size to palpal patella, femur rather long, only 1.34 times shorter than patella,

femur joints patella in its mid part. Terminal part of cymbiobulbus rather simple, without outgrowths. Palpal patella conical at proximal half (Figs 107–109, 147–148). Psempobolus without distinct outgrowths (Figs 147–151). Postgynum without parmula, but with small pit visible in high magnification in regular microscope or in transparenting light (Figs 110–111, 154).

MEASUREMENTS. Male: TL 1.86, CL 0.71, CW 0.55, CH 0.26, DSL 1.04, DSW 0.64, TiI 0.3, FeIV 0.54, PW 0.16, CI 0.76, DSI 0.62, CSI 0.68, FEI 0.76, LLI 0.42. — Female: TL 2.07, CL 0.74, CW 0.59, CH 0.29, DSL 1.29, DSW 0.8, TiI 0.31, FeIV 0.6, PW 0.17, CI 0.79, CHI 0.38, DSI 0.62, CSI 0.57, FEI 0.81, LLI 0.42.

DISTRIBUTION. Only Botswana.

Opopaea hoplites (Berland, 1914)

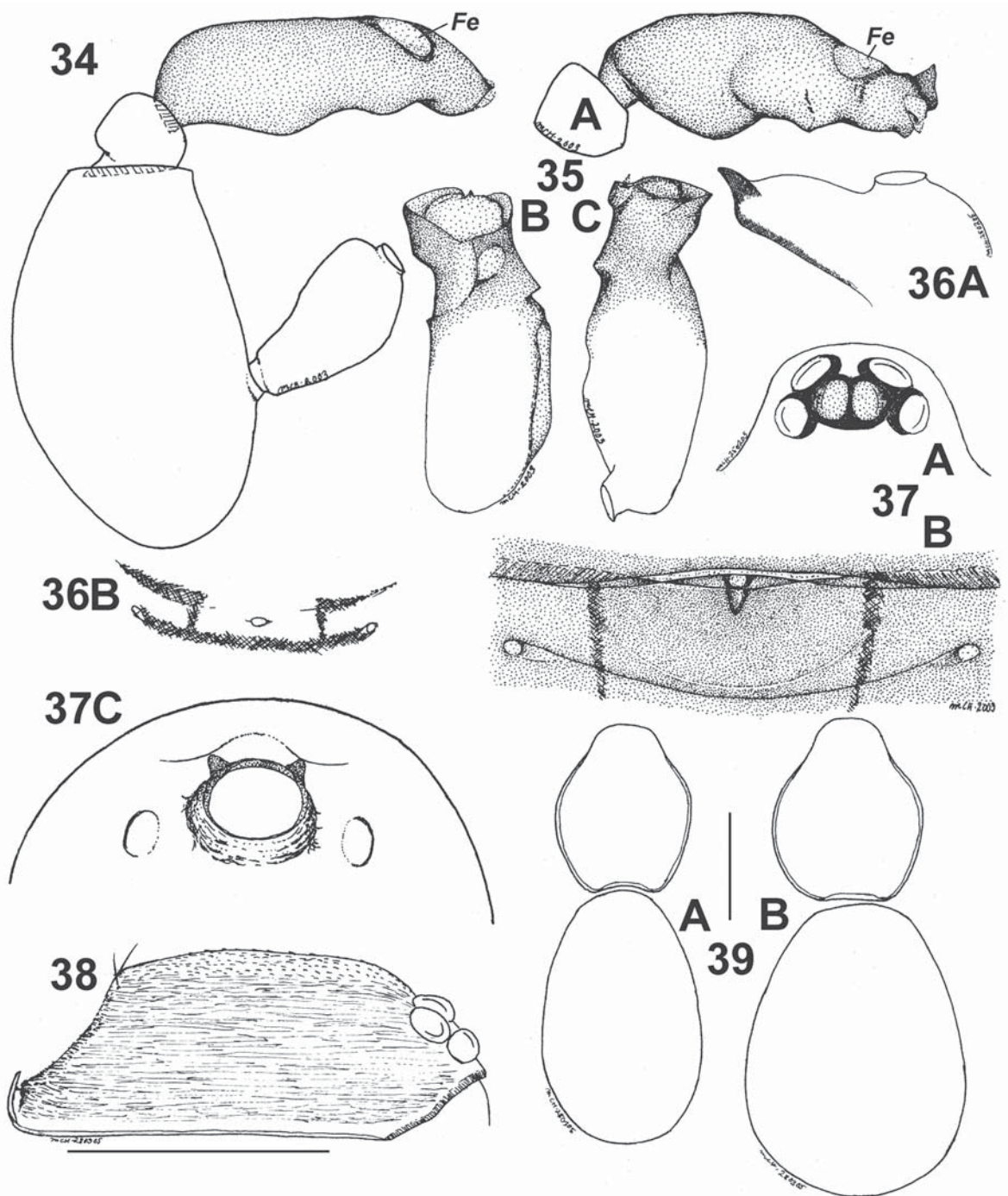
Figs 34–39, 186, 204, 208, 211, 235.

Gamasomorpha hoplites Berland, 1914: 79, f. 59–61 (D ♂ & ♀). *O. h.*: Brignoli, 1975: 229 (T from *Gamasomorpha*).

MATERIAL. KENYA: “Afr. or. anglaise : prairies alpines du Mt Kinangop, II-1912. Alluud et Jeannel, st. 55 senecio 289” lectotype ♂ and 2 ♂♂ and 1 ♀ paralectotypes (herein designated), (MNHN AR 5671/ 523).

DIAGNOSIS. Considerably large species (TL = 2.05–2.25). Male palp with long and narrow cymbiobulbus, its anterior end roughly truncate. Patella slightly longer than cymbiobulbus, about twice as wide as it and about four times wider than club-like femur. Postgynum of female about 2.5 times wider than long. Scutal ridge narrow, twisted, bullet-like parmula at its middle. Postgynal depression large, semicircular.

DESCRIPTION. Male. Body and palps dark orange, legs pale orange. Eyes subequal in size. Maxillae with small outgrowth on the tip. Dorsal scutum ovoid. Scutiopetiolar apparatus well developed. Opercula oval. Palpal patella ca

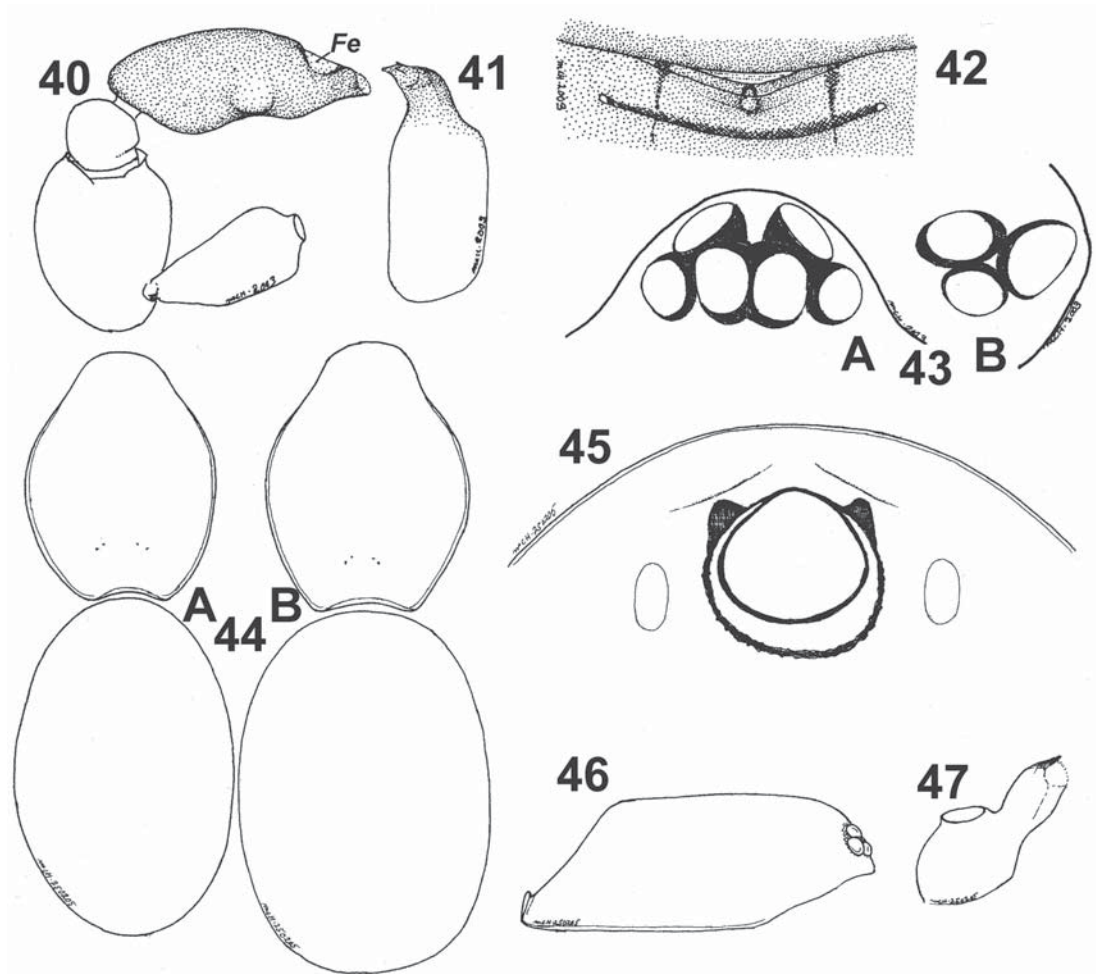


Figs 34–39. *Oporaea hoplites* (Berland, 1914): 34 — male palp, lateral; 35 — cymbiobulbus, lateral (A), dorsal (B), and ventral (C); 36 — male maxilla, ventral (A) and gonopore (B); 37 — female eyes, dorsal (A), postgynum, ventral (B) and scutopetiole apparatus, ventral (B); 38 — female carapace, lateral; 39 — male (A) and female (B) carapace (eyes not shown) and abdomen. Orig.

Рис. 34–39. *Oporaea hoplites* (Berland, 1914): 34 — палец самца, сбоку; 35 — цимбиобульбус, сбоку (A), сверху (B), и снизу (C); 36 — максилла самца, снизу (A) и гонопор (B); 37 — глаза самки, сверху (A), постгинум, снизу (B) и скутопетиолярный аппарат, снизу (B); 38 — карапакс самки, сбоку; 39 — габитус (глаза не показаны) самца (A) и самки (B). Ориг.

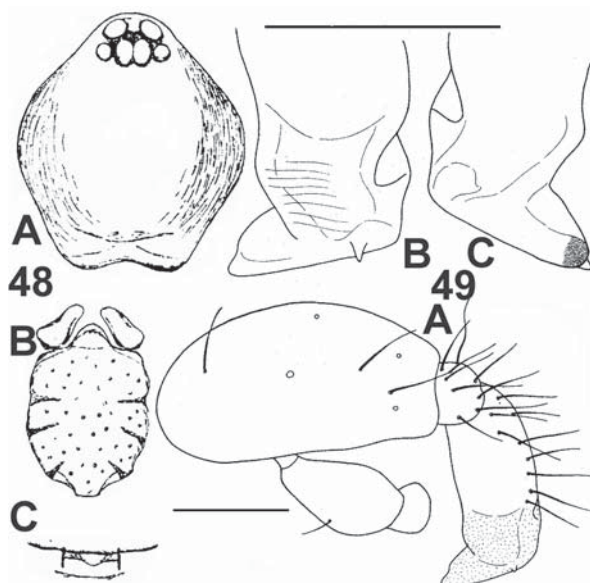
1.14 time longer than cymbiobulbus and twice longer than palpal femur (Fig. 34). Psembolus as wide as cymbial part of cymbiobulbus in dorsal and ventral view (Figs 35B–C). Tip of it with dark parts.

Female. Colouration similar to male but also palp pale orange. Postgynum of female about 2.5 times wider than long. scutal ridge narrow, twisted, bullet-like parmula at its middle. Postgynal depression large, semicircular.



Figs 40–47. *Opopaea kulczynskii* (Berland, 1914): 40 — male palp, lateral; 41 — cymbiobulbus, dorsal; 42 — postgynum, ventral; 43 — eyes, dorsal (A) and, lateral; 44 — male (A) and female (B) dorsal (eyes not shown); 45 — scutopetiolar apparatus of female, ventral; 46 — carapace, lateral; 47 — right maxillae, ventral. Scale bars: 0.2 mm. Orig.

Рис. 40–47. *Opopaea kulczynskii* (Berland, 1914): 40 — палец самца, сбоку; 41 — цимбиобульбус, сверху; 42 — постгинум, снизу; 43 — глаза, сверху (А) и, сбоку; 44 — самец (А) и самка (В) сверху (глаза не показаны); 45 — скутопетиоларный аппарат самки, снизу; 46 — карапакс, сбоку; 47 — правая максилла, снизу. Масштаб: 0,2 мм. Ориг.



Figs 48–49. *Opopaea margaritae* (Denis, 1947): 48 — female carapace, dorsal (A), sternum, maxillae and labium, ventral (B) and postgynum; 49 — pseMBOLUS (A & B) and whole male palp (C). Scale bars: 0.1 mm. After Denis [1947] & Brignoli [1974].

Рис. 48–49. *Opopaea margaritae* (Denis, 1947): 48 — карапакс самки, сверху (А), стернум, максиллы и лабиум, снизу (В) и постгинум; 49 — псеMBOLУС (А & В) и целый палец самца (С). Масштаб: 0,1 мм. По Denis [1947] и Brignoli [1974].

MEASUREMENTS. Male: TL 2.05, CL 0.84, CW 0.68, DSL 1.25, DSW 0.79, TiI 0.32, CI 0.81, DSI 0.63, CSI 0.67, LLI 0.38. Female: TL 2.25, CL 0.89, CW 0.71, DSL 1.43, DSW 1.05, TiI 0.36, CI 0.80, DSI 0.65, CSI 0.63, LLI 0.40.

DISTRIBUTION. Kenya.

Opopaea kulczynskii (Berland, 1914)

Figs 40–47, 191, 203, 206, 217, 233.

Gamasomorpha kulczynskii Berland, 1914: 80, f. 62–68 (D ♂).
O. k.: Brignoli, 1975: 229 (T from *Gamasomorpha*).

MATERIAL. Lectotype ♂ and ♀ paralectotype herein designated from Kenya “Afr. or. angl. : Shimoni, Alluaud et Jeannel, st. 9 (XI–1911)” in MNHN, Paris (AR 5676/ 523).

DIAGNOSIS. The male is recognized by the large cymbiobulbus which is about twice as long as patella is wide. Also femur is larger than usual, about as long as patella. Postgynum rather short, PGI = 3.5. Scutal ridge relatively narrow, at its middle transparent posteriorly pointing semicircular parmula above white circular area.

DESCRIPTION. Male. Body orange-brownish, male palps slightly paler, other appendages pale yellowish orange. Maxillae with small spine-like outgrowth. Dorsal scutum ovoid. Scutopetiolar apparatus well developed (Fig. 45). Opercula long oval. Palpal patella relatively short, 1.4 times shorter than cymbiobulbus, and almost equal (1.15 longer) to palpal patella; its length/width ratio 1.36.

Female. Colouration similar to male but also palp pale orange. Scutal ridge relatively narrow, at its middle transparent posteriorly pointing semicircular parmula above white circular area.

MEASUREMENTS. Male: TL 1.41, CL 0.61, CW 0.46, DSL 0.86, DSW 0.54, TiI 0.25, CI 0.76, DSI 0.63, CSI 0.71, LLI 0.41. Female: TL 1.52, CL 0.64, CW 0.50, DSL 0.95, DSW 0.62, TiI 0.25, CI 0.78, DSI 0.67, CSI 0.69, LLI 0.39.

DISTRIBUTION. Kenya.

Opopaea margaritae (Denis, 1947) **comb.n.**

Figs 48–49.

Gamasomorpha margaritae. Denis, 1947: 83, pl. IV, f. 13–15 (D ♀).

Opopaea sp. (? = “*Gamasomorpha*” *margaritae* Denis 1947): Brignoli, 1974: 413, f. 1–3 (♂).

MATERIAL. None.

DIAGNOSIS. Male is diagnosed (acc. to the Figs 1–3 by Brignoli) by the parallel sided cymbiobulbus with obliquely downwards pointing cone-like apex.

DESCRIPTION. Female holotype (after Denis [1947]): Total length 1.3. Carapace orange yellow, very slightly striated on sides, rather thick and flat, but abruptly sloping behind. Palp and legs yellow with red articulations. Abdominal scuta orange-yellow.

Male (after Brignoli [1974]): Total length 1.4. Carapace 0.57 long, 0.47 wide, abdomen 0.83 long. Palpal patella 1.37 times longer than cymbiobulbus and 2.18 times longer than palpal femur, its length/width ratio is about 1.9.

Leg measurement:

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	0.37	0.2	0.22	0.18	0.10	1.07
II	0.37	0.18	0.22	0.18	0.09	1.04
III	0.27	0.16	0.18	0.17	0.09	0.87
IV	0.41	0.20	0.31	0.25	0.15	1.32

COMMENTS. Brignoli (1974) was not sure if male described by him was conspecific with “*Gamasomorpha*” *margaritae* known by female only. Although he put *Gama-*

somorpha in quotation marks, he did not formally created a new combination. While describing this species Denis [1947] compared it with *O. kulczynskii*. Judging from the large size, male described by Brignoli [1974] most probably belongs to another species.

DISTRIBUTION. East Africa.

Opopaea mattica Simon, 1893

Figs 50–58, 122, 190, 216, 232.

Opopaea mattica Simon, 1893: 248 (D ♂ & ♀).

MATERIAL. Lectotype ♂ and 2 ♀♀ paralectotypes (herein designated), “Cape Town!” (MNHN AR 5747/ 526).

In the Cape Town tube additionally a female representing an unknown species and genus. Further the female from Gabon (Mq), (MNHN AR 5733/ 526) which belongs to the original material of *O. mattica* is not that species and is described above as *O. gabon* sp.n.

DIAGNOSIS. Patella ca. twice the size of cymbiobulbus; apical part of cymbiobulbus beak-like short part of it abruptly turned mesially. Postgynum relatively wide, PGI = 3.00. Scutal ridge very thin with knob-like parmula hanging over a semicircle postgynal depression (Fig. 53). Postgynum of *O. mattica* is similar to those in *O. botswana* sp.n. by having similar size and parmula, but have smaller depression (1/3 of distance between apodema in).

DESCRIPTION. Light orange, male palp colored as carapace and darker than legs. Eyes subequal in size. Male maxillae with short, spine-like outgrowth on the tip (Fig. 58). Scutopetiolar apparatus well developed (Fig. 55). Opercula rather long, elongate oval (Fig. 55B). Female palp as in Fig. 52. Male palpal patella slightly (1.09) longer than cymbiobulbus, and twice longer than palpal femurs, its length/width ratio is about 2.0 (Fig. 50).

MEASUREMENTS. Male: TL 1.57, CL 0.66, CW 0.5, CH 0.24, DSL 0.89, DSW 0.59, TiI 0.27, FeIV 0.43, CI 0.76, CHI 0.37, CSI 0.74, DSI 0.65, LLI 0.41, FEI 0.65. Female: TL 1.64, CL 0.69, CW 0.52, CH 0.27, DSL 1.03, DSW 0.71, TiI 0.29, FeIV 0.43, LO 0.07, PW 0.16, CI 0.76, CHI 0.39, CSI 0.67 DSI 0.69, LLI 0.42, FEI 0.63, OI 0.45.

DISTRIBUTION. South Africa, Cape Town.

Opopaea probosciella Saaristo, 2001

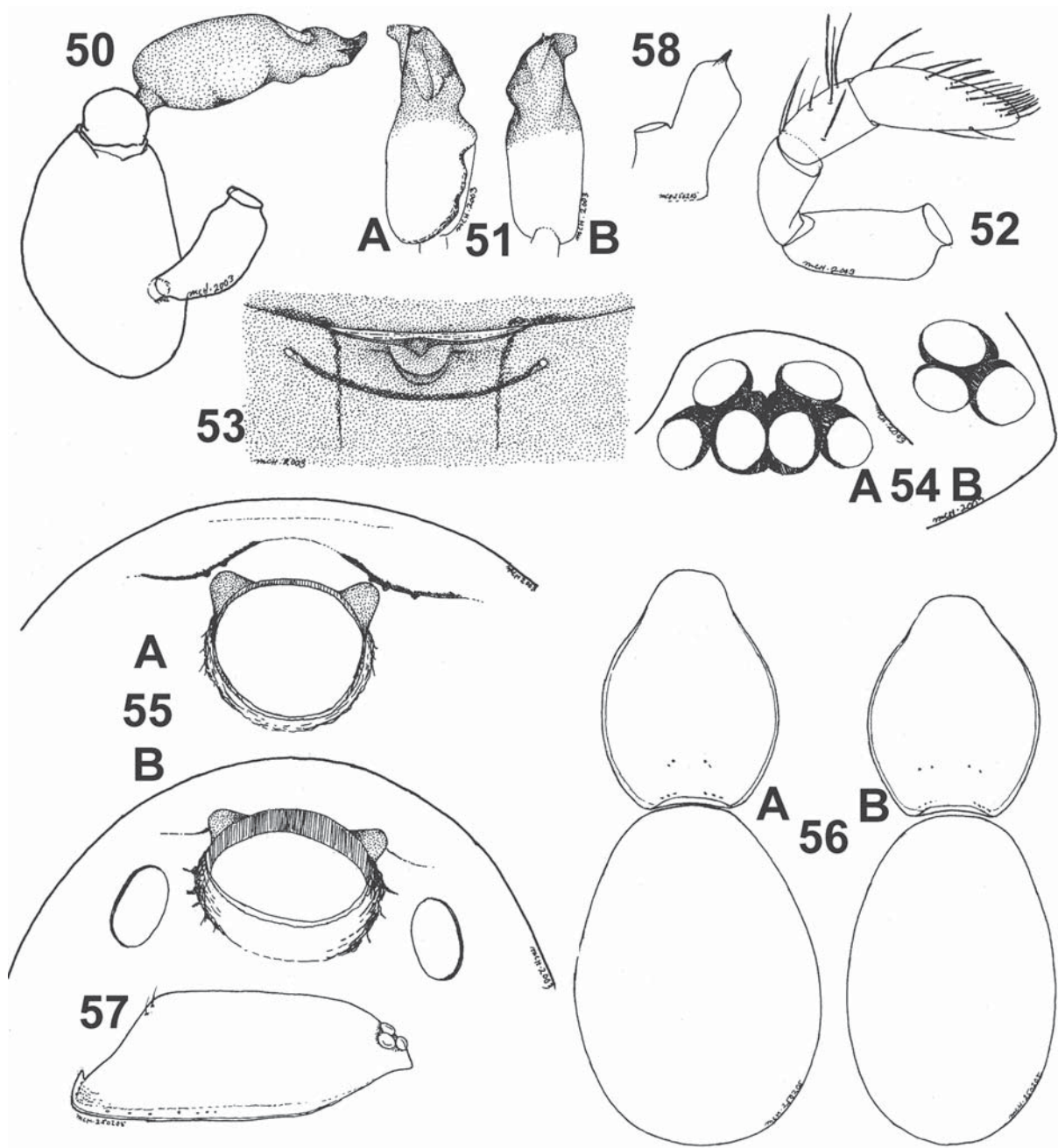
Figs 59–63.

Opopaea probosciella Saaristo, 2001: 337, f. 107–108, 109A–B, 110–111 (D ♀).

MATERIAL. ♀ holotype from Seychelles, Farquhar Atoll, 16.–19.8.1984, USSR. Zool. Exped. (ZMMU). Deposited in the Zoological Museum of the Moscow University, Russia.

DIAGNOSIS. Female (male unknown) of this small species is easily recognized by the fairly large, posteriorly pointing finger-like parmula of the anterior border of the postgynal depression. PGI = 2.67 (Figs 60–61).

DESCRIPTION. Small (TL = 1.50, CL = 0.56), light-coloured species; whole animal pale yellowish except integument between dorsal and ventral scuta white. Sides of carapace with very fine striae; top smooth, shiny, on its edges lines of irregularly positioned, medially pointing short suberect hairs, at its posterior border two pairs of longer, upstanding hairs. Eyes rather large, equal in size; anterior eyes about half their diameter apart, touching posterolateral eyes; posterior eyes in same line, touching each others (Fig. 63). Sternum sparsely and very finely punctuated; radial furrows well-developed. Operculae rather large, oval shaped almost as wide as petiolar tube (Fig. 60). Dorsal scutum



Figs 50–58. *Opopaea mattica* Simon, 1893: 50 — male palp, lateral; 51 — cymbiobulbus, dorsal (A) and ventral (B); 52 — female palp, lateral; 53 — postgynum, ventral; 54 — eyes, dorsal (A) and lateral (B); 55 — scutopetiolar apparatus anteriorly (A) and ventral (B); 56 — male (A) and female (B), dorsal (eyes not shown); 57 — male carapace, lateral; 58 — male maxillae, ventral. Scale bars: 0.2 mm. Orig.

Рис. 50–58. *Opopaea mattica* Simon, 1893: 50 — палец самца, сбоку; 51 — цимбиобульбус, сверху (А) и снизу (В); 52 — палец самки, сбоку; 53 — постгинум, снизу; 54 — глаза, сверху (А) и сбоку (В); 55 — скутопетиолярный аппарат спереди (А) и снизу (В); 56 — самец (А) и самка (В), сверху (глаза не показаны); 57 — карапакс самца, сбоку; 58 — максилла самца, снизу. Масштаб: 0,2 мм. Ориг.

moderately clothed with short suberect hairs. CI = 0.75, DSI = 0.68, LLI = 0.43, CSI = 0.82. Female postgynum with rather large posteriorly pointing finger-like parmula arising medially from anterior border of posterior scutum, standing over shallow depression.

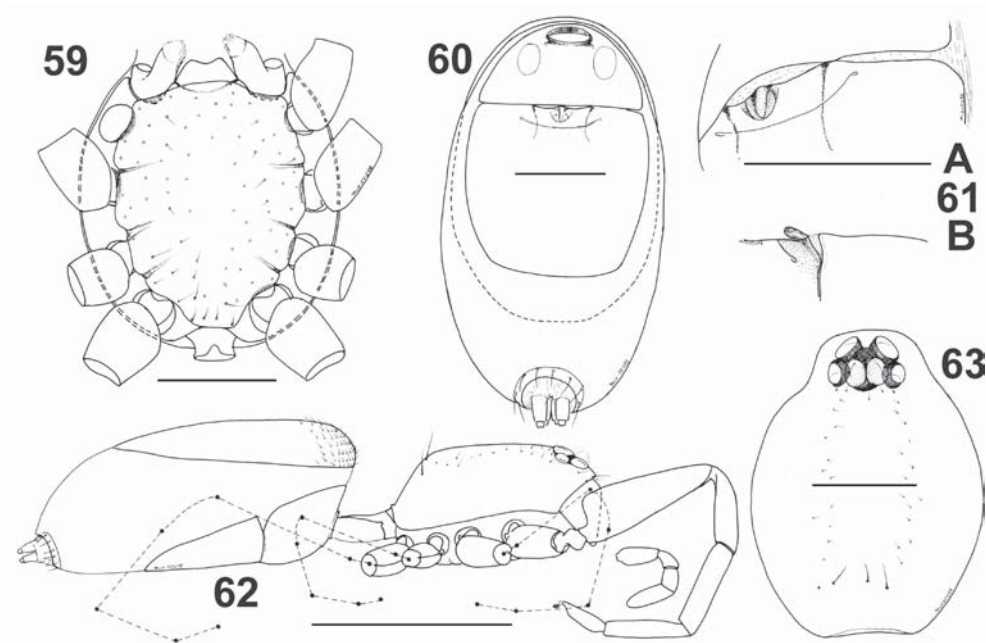
DISTRIBUTION. Only the type specimen from Farquhar Atoll, Seychelles.

Opopaea punctata (O. Pickard–Cambridge, 1872)
Figs 64–72, 155–160, 196, 202, 227.

Oonops punctatus O. Pickard–Cambridge, 1872: 223, pl. 14, f. 3A (D ♂).

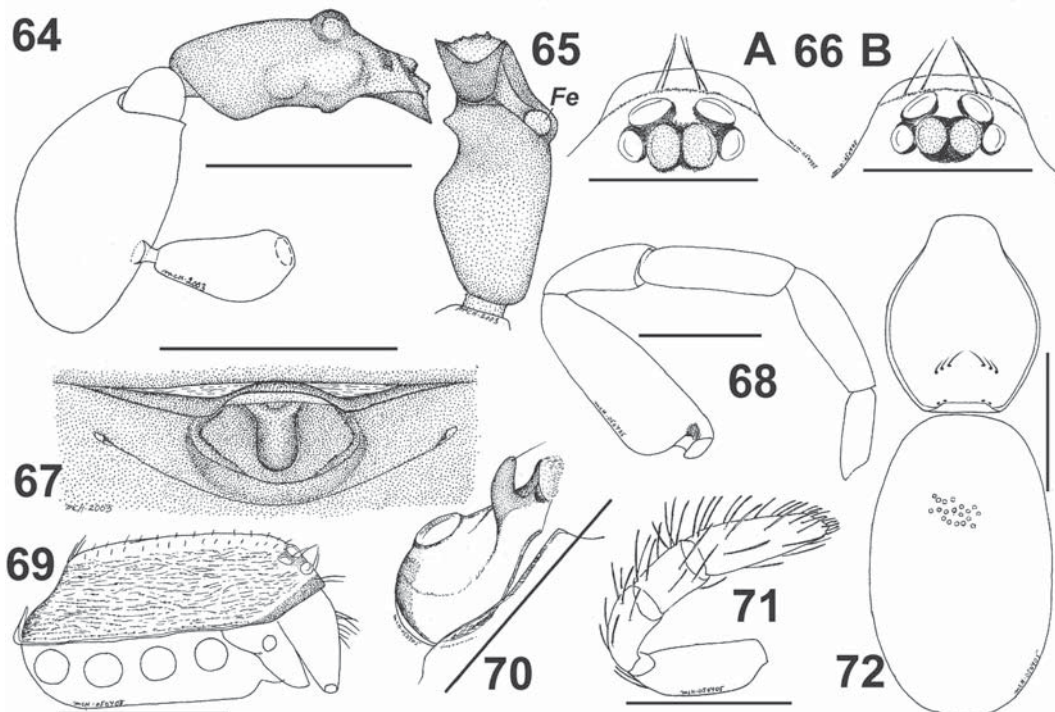
O. p.: Simon, 1910: 309.

O. p.: Brignoli, 1975: 224, f. 1–4 (♂).



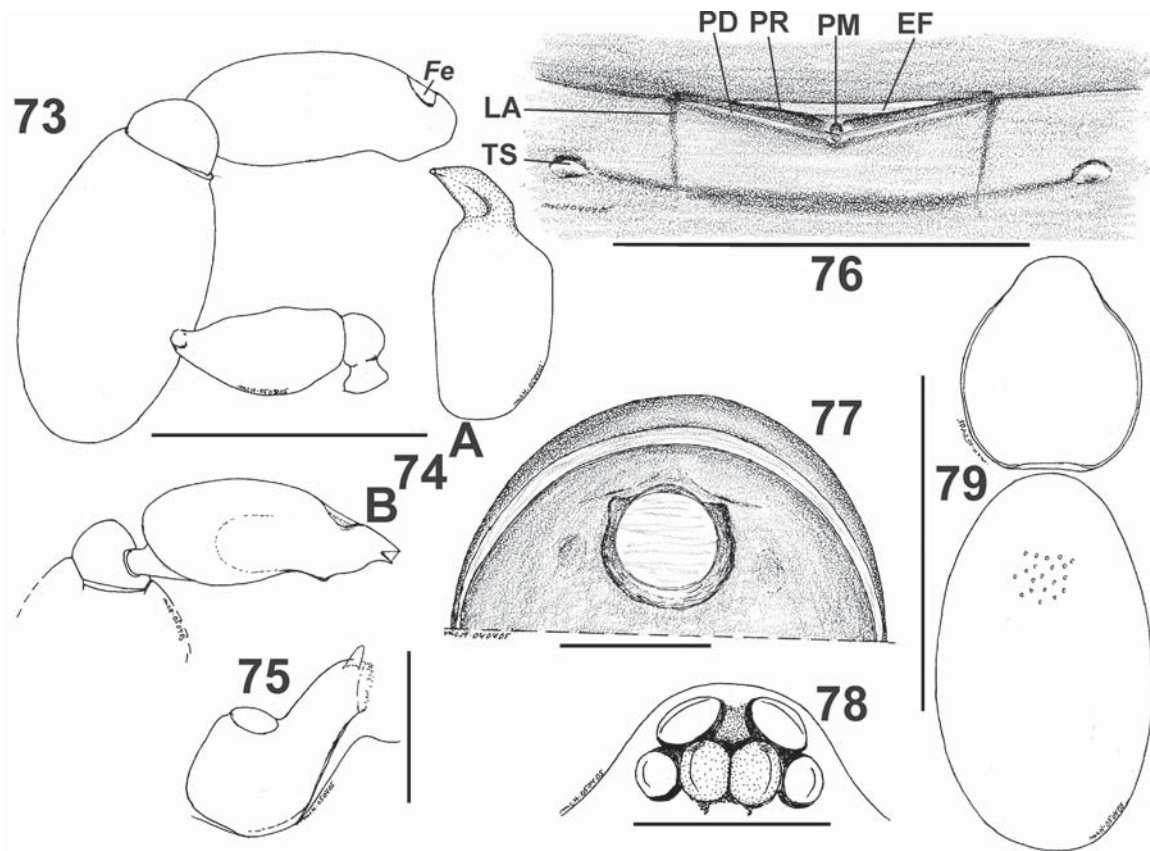
Figs 59–63. *Opopaea probosciella* Saaristo, 2001: 59 — sternum and endites of female, ventral; 60 — abdomen of female, ventral; 61 — epigastric area of female obliquely ventral (A) and sinistrolateral (B); 62 — female, dextrolateral; 63 — carapace of female, dorsal. Scale bars: 0.2 mm. Orig.

Рис. 59–63. *Opopaea probosciella* Saaristo, 2001: 59 — стернум и тазики самки, снизу; 60 — брюшко самки, снизу; 61 — эпигастральная область самки снизу (A) и сбоку (B); 62 — самка, сбоку; 63 — карапакс самки, сверху. Масштаб: 0,2 мм. Ориг.



Figs 64–72. *Opopaea punctata* (O. Pickard–Cambridge, 1872): 64 — right male palp, lateral; 65 — cymbiobulbus, ventral; 66 — eyes of female (A) and male (B), dorsal; 67 — postgynum, ventral; 68 — leg I, lateral; 69 — male carapace laterally; 70 — male maxillae, ventral; 71 — female palp, lateral; 72 — carapace (eyes not shown) and abdomen of male, dorsal. Scale bars: 0.2 mm, except 68, 69, and 72. Orig.

Рис. 64–72. *Opopaea punctata* (O. Pickard–Cambridge, 1872): 64 — правый палец самца, сбоку; 65 — цимбиобульбус, снизу; 66 — глаза самки (A) и самца (B), сверху; 67 — постгинум, снизу; 68 — нога I, сбоку; 69 — карапакс самца, сбоку; 70 — максилла самки, снизу; 71 — пальпа самки, сбоку; 72 — карапакс (глаза не показаны) и брюшко самца, сверху. Масштаб: 0,2 мм, кроме 68, 69, и 72. Ориг.



Figs 73–79. *Opopaea santschii* Brignoli, 1974: 73 — right male palp, lateral; 74 — cymbiobulbus, dorsal (A) and laterofrontally (B); 75 — male maxilla, ventral; 76 — postgynum, ventral; 77 — scutopetiolear apparatus, ventral; 78 — eyes of male, dorsal; 79 — carapace (eyes not shown) and abdomen of male, dorsal. Scale bars: 0.2 mm, except for Fig. 75: 0.1 mm and 79: 1.0 mm. Orig.

Рис. 73–79. *Opopaea santschii* Brignoli, 1974: 73 — правый палец самца, сбоку; 74 — цимбиобульбус, сверху (A) и сбоку-спереди (B); 75 — максилла самца, снизу; 76 — постгинум, снизу; 77 — скутопетилярный аппарат, снизу; 78 — глаза самца, сверху; 79 — карапакс (глаза не показаны) и брюшко самца, сверху. Масштаб: 0,2 мм, кроме 75: 0,1 мм. и 79: 1,0 мм. Ориг.

O. p.: Assi, 1982: 87, f. 1 (D ♀).

O. p.: Saaristo, 2007: 133, f. 70–78 (♂ & ♀).

MATERIAL. ISRAEL: Haifa, 1 ♂, 3 ♀♀, 10.I.1942, A. Shulov leg., (HUJ 15305); Kefar Sava, 1 ♂, 17.III.1944, A. Shulov leg. (HUJ 15306); Sho'mera, 1 ♂, 26.II.1967, Y. Zohar leg. (HUJ 15312); Kefar Ez'yon, 1 ♂, 03.I.1972, P. Amitai leg. (HUJ 15313); Ma'agan Mikhael, 2 ♀♀, II.1987, V. Roth leg. (HUJ 15322); Geshur, Golan, pitfall trap, 1 ♂, II.1999, R. Sharon leg. (HUJ 15330); Giv'at Zekharya, pitfall trap, 4 ♂, 2 ♀♀, 22.III.2002, Y. Mandelik leg. (HUJ 15336, MZT AA 3.709); Nehusha, pitfall trap, 6 ♂♂, 1 ♀, 22.III.2002, Y. Mandelik leg. (HUJ 15430); Ramat Avishur, pitfall trap, 6 ♂♂, 22.III.2002 Y. Mandelik leg. (HUJ 15431); Nehusha, pitfall trap, 5 ♂♂, 1 ♀, 14.V.2002, Y. Mandelik leg. (HUJ 15432); Ramat Avishur, pitfall, 6 ♂♂, 14.OV.2002, Y. Mandelik leg. (HUJ 15433); Giv'at Zekharya, pitfall, 4 ♂♂, 1 ♀, 14.V.2002, Y. Mandelik leg. (HUJ 15434); Sedot Mikha, pitfall, 4 ♂♂, 1 ♀, 14.V.2002, Y. Mandelik leg. (HUJ 15435); Har Sansan, pitfall, 1 ♂, 14.V.2002 Y. Mandelik leg. (HUJ 15436). Sedot Mikha, pitfall trap, 1 ♂ [no palps!], 22.III.2002, Y. Mandelik leg., (HUJ 15334).

DIAGNOSIS. Male of *O. punctata* is easily recognized from all other *Opopaea* species by the round, well elevated palpal fenestra (Figs 64–65) and the female by the large, backwards pointing block-like parmula of the postgynum (Figs 67, 157–158).

DESCRIPTION. Male. Body brownish orange, male palp coloured almost as dark as carapace, legs somewhat paler. Sides of carapace with distinct longitudinal streaks, dorsal

plane smooth; three pairs of strong, upstanding hairs on its posterior end and two pairs of small, dent-like elevations close to the posterior edge of carapace (Fig. 72). Eyes fairly large; PME's largest, almost touching each other, ALE's slightly smaller than PME's nearly touching them and about their diameter apart, PLE's smallest, touching PME's. Sternum with well distinguished radial furrows. Distal part of maxillae strongly sclerotized with blunt-tipped horn-like extension. Dorsal scutum oval shaped, fairly densely covered with short, subdecumbent hairs rising from small pits. Legs of average length, thick and spineless. Scutopetiolear apparatus well-developed; operculae small, narrow. Sperm pore (=gonopore) well discernable, transverse. Posterior ring furnished with some twelve, relatively long, curved hairs. Colulus very small with two hairs. Patella of male palp about the same size as cymbiobulbus and 1.67 longer than palpal femur. Palpal patella width is equal to palpal femur length. Palpal fenestra elevated, roughly circular (Fig. 64–65). Psempobolus almost black.

Female like male except maxillae without projection. Parmula large, block-like, postgynal depression short, occupies 1/3 of space between lateral apodema (Fig. 227).

MEASUREMENTS. Male: TL 1.39, CL 0.61, CW 0.46, CH 0.21, DSL 0.79, DSW 0.51, TII 0.21, FeIV 0.39, CI 0.76, CHI 0.35, CSI 0.77, DSI 0.64, LLI 0.35, FEI 0.65. Female: TL 1.46, CL 0.61, CW 0.46, CH 0.18, DSL 0.89,

DSW 0.54, Tii 0.20, FeIV 0.36, CI 0.76, CHI 0.29, CSI 0.68, DSI 0.60, LLI 0.32, FEI 0.59.

COMMENTS and DISTRIBUTION. This species was included to our review because it was reported from Northern and Southern Africa several times [cf. Roewer, 1942]. We found no specimens of this species outside of Israel and Lebanon, and all records of *O. punctata* outside of *terra typica* are doubtful and must be checked.

Opopaea santschii Brignoli, 1974

Figs 73–79, 133–135, 166–169, 195, 198, 222, 236.

O. s. Brignoli, 1974: 409, f. 4–5 (D ♂).

O. s.: Saaristo, 2007: 135, f. 79–85 (♂ & ♀).

MATERIAL. TUNIS: 1 ♂ (possibly a holotype!), Kairouan, Été 1914, F. Santschi leg. (MNHN AR 5746/ 526). EGYPT: 1 ♂, Soloun, 19.I.1960 J.A.L.Cooke (MRAC 130:818), "*Opopaea punctata* det. P.L.G. Benoit, 1966).

COMPARATIVE SPECIMENS. ISRAEL. Bet Dagan, 1 ♀, 20.I.1965, Sh. Amitai leg. (HUJ 15309); Jerusalem, 1 ♀ (damaged), 28.X.1967, G. Tsabar leg. (HUJ 15310); Jerusalem, 1 ♀, 13.III.1981, G. Levy leg. (HUJ 15315); Jerusalem, 1 ♂, 25.XI.1981, G. Levy leg. (HUJ 15316); Jerusalem, 1 ♀, 28.IV.1983, G. Levy leg. (HUJ 15317); Jerusalem, 1 ♀, 5.IX.1986, G. Levy leg. (HUJ 15318); Sede Boqer, 1 ♂, 1 ♀, .I.1987, V. Roth leg. (HUJ 15320); Jerusalem, 1 ♂, 13.XI.1989, G. Levy leg. (HUJ 15325); near Elot, southern Rift Valley, by pitfall traps, 1 ♂, 26.IV.2003, U. Shanas leg. (HUJ 15380). CYPRUS: Limasol, hotel area, on *Eucalyptus* trunk, 1 ♂, 13.IV.1997, S. Koponen leg. (MZT AA 3.701).

NOTE. Holotype of *O. santschii* according to the original description came from the Natural History Museum in Genève (Museo di Storia Naturale di Ginevra). Holotype male has label "Kairouan, 1915, F. Santschi". Specimen from Paris has almost the same label, with the exception of year. There is some possibility that type was misplaced in different museum, and Paris's specimen is actually a holotype.

DIAGNOSIS. The male of *santschii* is distinguished by the long cylindrical cymbiobulbus with short, somewhat medially turned pseMBOLUS (Figs 73–74) and the female by having almost inconspicuous parmula under the narrow postgynal ridge (Fig. 76). PGI = 3.47.

DESCRIPTION. Male (description based on specimens from Israel). Body and male palps light orange, legs pale orange. Sides of carapace covered with very dilute longitudinal streaks, dorsal plane smooth, shiny. ALEs exceptionally large, ca. one third of their diameter apart, PMEs slightly larger than ALEs, touching each others, ALEs, and PLEs smallest, almost touching ALEs (Fig. 78). Sternum with well distinguished radial furrows. Anterior end of maxillae with small, blunt-tipped projection (Fig. 75). Dorsal scutum oval-shaped, sparsely covered with short, subdecumbent hairs arising from small pits (Fig. 79). Legs of average length, thick, and spineless. Lobes on anterolateral corners of petiolar tube reduced into small knobs; operculae oval-shaped, small, difficult to see (Fig. 77). Sperm pore (=gonopore) well discernable, transverse. Scutopetiolar apparatus poorly developed (Figs 77, 135). Posterior ring furnished with some twelve, relatively long, curved hairs. Colulus very small with two hairs. Patella of male palp somewhat (1.1 times) larger than cymbiobulbus and 1.8 longer than palpal femur (Figs 73, 166–169). Palpal patella length/width ratio 1.63, its width exceeds length of femur. In dorsal view embolus beak-like (Fig. 74A), bent medially.

Female (description based on specimens from Israel). Female like male except maxillae without projection. Scutopetiolar apparatus poorly developed: petiolar tube short, its

extensions are not triangular but half oval shaped, ridges fused and forms wide angle (ca 170°). Postgynum wide and not high, with narrow postgynal ridge and almost inconspicuous parmula (Figs 76, 133–135).

MEASUREMENTS. Male: TL 1.21, CL 0.50, CW 0.39, CH 0.16, DSL 0.71, DSW 0.43, Tii 0.20, FeIV 0.36, CI 0.79, CHI 0.32, CSI 0.70, DSI 0.64, LLI 0.39, FEI 0.71. Female: TL 1.43, CL 0.54 CW 0.43, CH 0.18, DSL 0.93, DSW 0.57, Tii 0.20, FeIV 0.36, CI 0.80, CHI 0.33, CSI 0.58, DSI 0.62, LLI 0.37, FEI 0.67.

Holotype ♂ measurements (after Brignoli, 1974): Total length 1.17. Carapace 0.47 long, 0.37 wide. Abdomen 0.7 long.

Leg measurement:

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	0.31	0.16	0.18	0.18	0.19	0.93
II	0.27	0.16	0.18	0.18	0.10	0.89
III	0.25	0.12	0.15	0.15	0.10	0.77
IV	0.33	0.18	0.27	0.22	0.12	1.12

DISTRIBUTION. Previously recorded only from Tunis. New to Israel and Cyprus.

Opopaea silhouettei (Benoit, 1979)

Figs 80–84, 136, 230.

Gamasomorpha silhouettei Benoit, 1979: 200, f. 5A–C (D ♂ & ♀).

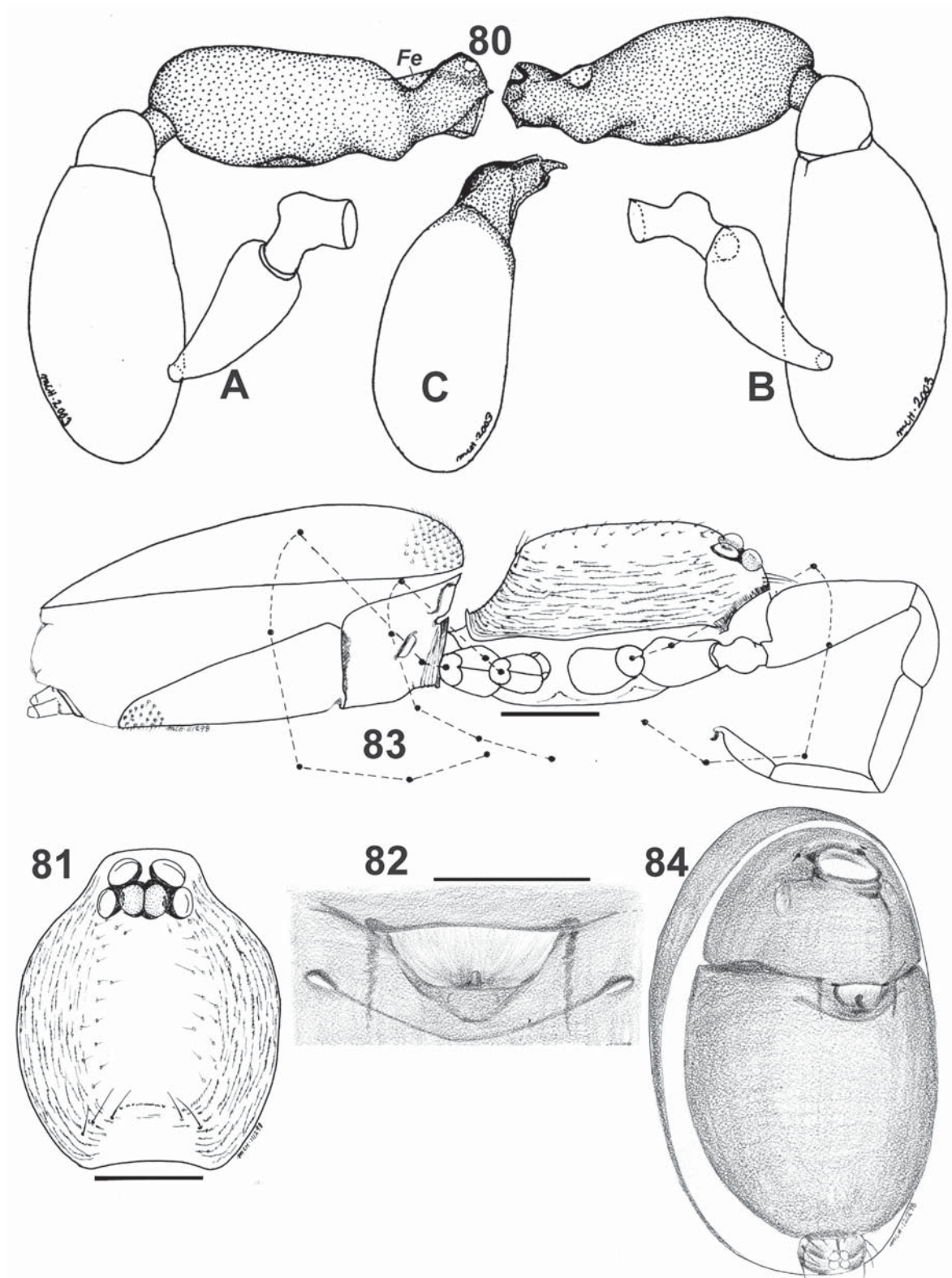
O. s.: Baert, Lehtinen & Desender, 1997: 16 (T from *Gamasomorpha*).

O. s.: Saaristo, 2001: 337, f. 102–106 (♂ & ♀).

MATERIAL. SEYCHELLES: holotype ♀ and allotype ♂, Silhouette, Mont Dauban, 5.–7.7.1972, P. L. G. Benoit & J. J. van Mol leg. (MRAC 146.341); ♀, *Pisonia* forest, leaf litter, 1990, Justin Gerlach leg. (MZT AA 0.073); 3 ♀♀, Gratte Fesse, *Pandanus hornei* crown, 13.07.2000, J. Gerlach leg. (MZT AA 1.378).

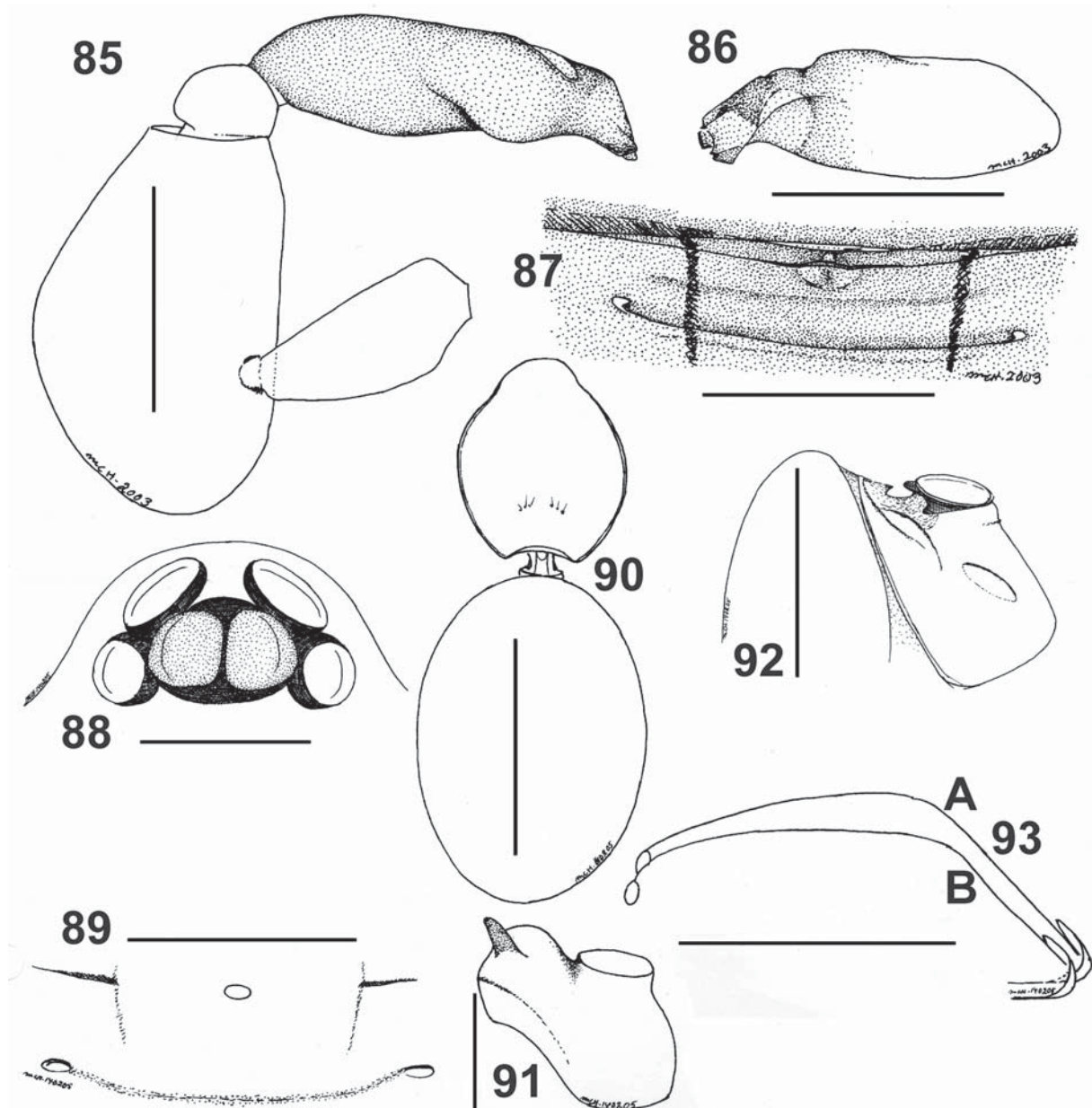
DIAGNOSIS. The male of *O. silhouettei* can be recognized by the very small palpal fenestra and in lateral view apex of cymbiobulbus points upwards and in dorsal view obliquely laterally ending in small claw-like extension. Cymbiobulbus slightly but clearly bigger than patella which is almost 4 times as big as femur. Postgynum quadrate, PGI = 1.67. Circular postgynal depression rather deep with wide edges and parmula standing on the bottom of the depression (Figs 82, 84, 136).

DESCRIPTION. Small (TL = 1.40, CL = 0.56), light-coloured species with pale yellow legs. Sides of carapace covered with longitudinal streaks, dorsal plane smooth, shiny. Two, sometimes three strong upstanding hairs at posterior border of dorsal surface and double rows of rather short, mesially pointing, addressed hairs at lateral edges (Fig. 81). Sternum with well distinguished radial furrows. Dorsal scutum ovoid densely covered with short, subdecumbent hairs arising from rather wide pits. Legs short, thick (Fig. 83). Opercula small, oval shaped (Fig. 84). Dorsolateral corners of petiolar tube drawn into triangular lobes which have small counterparts on ventral scutum. Posterior ring well-developed. Colulus very small with two hairs. Male and female similar; CI = 0.81, DSI = 0.71, LLI = 0.31, CSI = 0.67. Male palpal patella slightly shorter than cymbiobulbus (their ratio 0.87), and almost twice longer than palpal femur, patellar length/width ratio is about 2.0 (Figs 80A–B). Apical part of cymbiobulbus somewhat elongated, comprising ca. half of rest of bulbus; apex of cymbiobulbus dilated into two triangular side lobes. Club-like femur appreciably large, inserted with patella close to its proximal end (Figs 80A–B). On the posterior side of epigastric furrow of female large



Figs 80–84. *Opopaea silhouettei* (Benoit, 1979): 80 — male palp, lateral (A), medial (B), and cymbiobulbus, dorsal (C); 81 — carapace of female, dorsal; 82 — postgynum, ventral; 83 — female dextrolateral; 84 — obliquely ventral view of female abdomen. Scale bars: 0.2 mm. Orig.

Рис. 80–84. *Opopaea silhouettei* (Benoit, 1979): 80 — палепус самца, ретролатерально (А), пролатерально (В), и цимбиобульбус, сверху (С); 81 — карапакс самки, сверху; 82 — постгинум, снизу; 83 — самка, сбоку; 84 — брюшко самки, полусбоку. Масштаб: 0,2 мм. Ориг.



Figs 85–93. *Opopaea simoni* (Berland, 1914): 85 — male palp, lateral; 86 — cymbiobulbus, dorsal; 87 — postgynum, ventral; 88 — eyes of female, dorsal; 89 — epigastric area of male; 90 — carapace (eyes not shown) and abdomen of female, dorsal; 91 — right maxilla of male, ventral; 92 — scutopetiolar apparatus dextralateral; 93 — contours of female (A) and male (B) carapace, lateral. Scale bars: 0.2 mm, except 90 — 1.0 mm and 92, 93 — 0.5 mm. Orig.

Рис. 85–93. *Opopaea simoni* (Berland, 1914): 85 — палец самца, сбоку; 86 — цимбиобульбус, сверху; 87 — постгинум, снизу; 88 — глаза самки, сверху; 89 — эпигастральная область самца; 90 — карапакс (глаза не показаны) и брюшко самки, сверху; 91 — правая максилла самца, снизу; 92 — скутопетиолярный аппарат, сбоку; 93 — абрис карапакса самки (A) и самца (B), сбоку. Масштаб: 0,2 мм, кроме 90 — 1,0 мм и 92, 93 — 0,5 мм. Ориг.

triangular depression with short plug-like parmula about at its middle (Figs 82, 84, 136).

DISTRIBUTION. Seychelles, Rapa Nui.

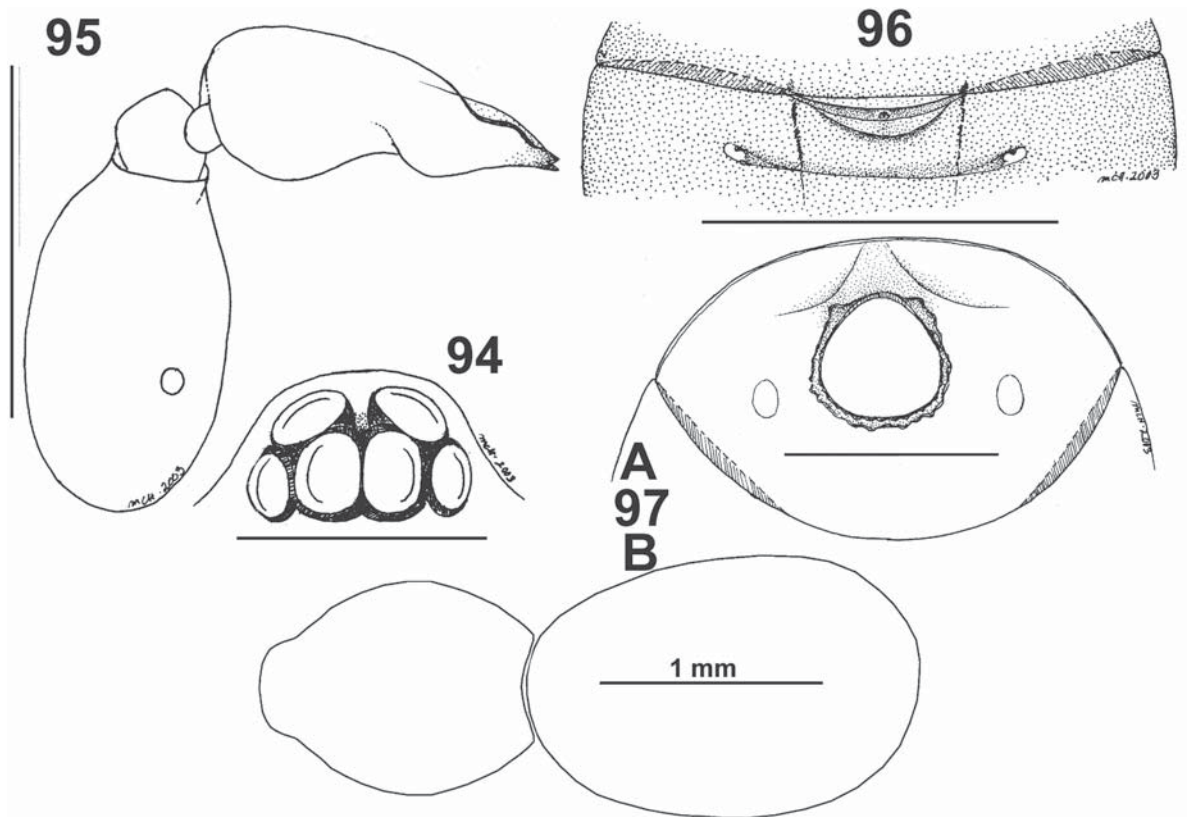
Opopaea simoni (Berland, 1914)

Figs 85–93, 187, 209, 212, 234.

Gamasomorpha simoni Berland, 1914: 76, f. 50–58 (D ♂ & ♀).
O. s.: Brignoli, 1975: 229 (T from *Gamasomorpha*).

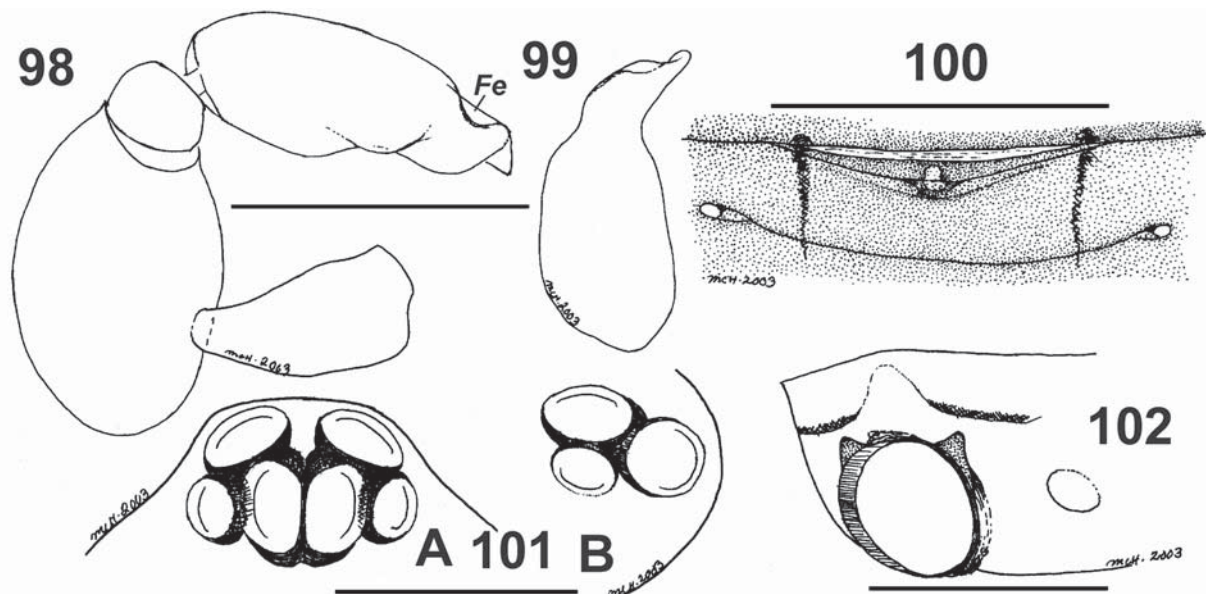
MATERIAL. KENYA: lectotype ♂ and paralectotype ♀ (here-in designated) "Afr. Or. Anglaise : Kenya Alluaud et Jeannel, st. n° 39 (I-1912)" (MNHN AR 5687/ 523). Lectotype male with only one dissected palp.

DIAGNOSIS. The male of *O. simoni* is distinguishable by the cylindrical cymbiobulbus which is as long as patella and apically pointing downwards. Patella twice the size of the cymbiobulbus. Postgynum rather narrow; PGI = 2.67. Postgynal depression small semicircle (Fig. 87). Scutal ridge of average width.



Figs 94–97. *Oporaea speciosa* (Lawrence, 1952): 94 — ocular area, dorsal; 95 — right male palp, retrolateral; 96 — postgynum, ventral; 97 — anteroventral view of scutopetiolar apparatus (A) and carapace (eyes not shown) and abdomen (B). Scale bars: 0.2 mm, excepts 97B — 1.0 mm. Orig.

Рис. 94–97. *Oporaea speciosa* (Lawrence, 1952): 94 — глазное поле, сверху; 95 — правый палец самца, ретролатерально; 96 — постгинум, снизу; 97 — скутопетиолярный аппарат (A) и габитус (глаза не показаны) (B). Масштаб: 0,2 мм, кроме 97B — 1,0 мм. Ориг.



Figs 98–102. *Oporaea sudan* sp.n.: 98 — male palp lateral; 99 — cymbiobulbus, dorsal; 100 — postgynum, ventral; 101 — eyes, dorsal (A) and lateral (B); 102 — anterolateral view of scutopetiolar apparatus. Scale bars: 0.2 mm.

Рис. 98–102. *Oporaea sudan* sp.n.: 98 — палец самца сбоку; 99 — цимбиобульбус, сверху; 100 — постгинум, снизу; 101 — глаза, сверху (A) и сбоку (B); 102 — скутопетиолярный аппарат. Масштаб: 0,2 мм.

DESCRIPTION. Male. Body and palps pale orange, other appendages pale yellowish orange. Dorsal scutum ovoid. Scutiopetiole apparatus well developed (Fig. 92). Maxilla with short and thin finger like outgrowth (Fig. 91). Petiolar tube with distinct median hollow. Cymbiobulbus is equal in length to palpal patella, and twice thinner (Fig. 85). Psempolus without distinct outgrowths (Figs 85–86). Femur attached at basal 1/3. Opercula fairly large (Fig. 234).

Female. Colouration similar to male but also palp pale orange. Postgynum without parmula but with small depression (Fig. 87).

MEASUREMENTS. Male: TL 2.1, CL 0.79, CW 0.64, DSL 1.21, DSW 0.75, TiI 0.32, CI 0.82, DSI 0.62, CSI 0.65, LLI 0.41. Female: TL 2.45, CL 0.87, CW 0.68, DSL 1.47, DSW 1.04, TiI 0.36, CI 0.76, DSI 0.71, CSI 0.63, LLI 0.41.

DISTRIBUTION. East Africa.

Opopaea speciosa (Lawrence, 1952)

Figs 94–97.

Gamasomorpha speciosa Lawrence, 1952: 189, f. 12–14 (D ♂).

O. s.: Brignoli, 1975: 230 (T from *Gamasomorpha*).

O. s.: Saaristo & van Harten, 2006: 142, f. 42–45 (♂, D ♀).

MATERIAL. YEMEN: 1 ♂, Ja'ar, 23.III.1998, A. van Harten, MZT AA 3.041; 1 ♀, Medinat ash Shirq, 15.VIII.2000, A. van Harten (MZT AA 3.033).

DIAGNOSIS. The male of *O. speciosa* is readily distinguished by the apically narrowing cymbiobulbus with a shallow, elongated fenestra and bifid apex. Postgynum of the female rather high but narrow, PGI = 2.37; small, rounded parmula below the postgynal ridge (Fig. 96).

DESCRIPTION. Male. Body light orange, legs pale orange. Sides of carapace covered with fairly dilute longitudinal streaks, dorsal plane smooth, shiny. Anterior eyes somewhat larger than PLEs about 1/3 of their diameter apart, PME's largest, posterior eye row slightly procurved (Fig. 94). Anterior end of maxillae with small, sharp-pointed projection. Sternum smooth, glossy, with well distinguished radial furrows. Legs short, thick, and spineless. Dorsal scutum oval-shaped, sparsely covered with short, subdecumbent hairs arising from small pits. Lobes on anterolateral corners of petiolar tube small, ridges weakly developed, scutal cove reaching frontal edge of anterior scutum; operculae very small, oval-shaped, OI = 0.27 (Fig. 97A). Patella of male palp about same size as cymbiobulbus, their ratio 0.94, patellar length/width ratio 1.68. Cymbiobulbus apically narrowing with very low but long fenestra and bifid apex (Fig. 95).

Female like male except maxillae without projections. Postgynum with fine parmula (Fig. 96).

MEASUREMENTS. Male: TL 1.36, CL 0.54, CW 0.43, DSL 0.82, DSW 0.52, TiI 0.21, CI 0.80, DSI 0.63, CSI 0.65, LLI 0.40. Female: TL 1.46, CL 0.57, CW 0.45, DSL 0.89, DSW 0.54, TiI 0.21, CI 0.78, DSI 0.60, CSI 0.64, LLI 0.38.

REMARKS. We have not seen the type of this species but Lawrence's (1952) figure is in good agreement with the specimens from Yemen.

DISTRIBUTION. Natal [Lawrence, 1952] and Yemen [Saaristo & van Harten, 2006].

Opopaea sudan sp.n.

Figs 98–102.

TYPE MATERIAL. Holotype ♀ and paratype ♂, SUDAN: Khartoum, 1954, J. Cloudsley-Thompson (MRAC 133.684) and 1

♀, 1 ♂ paratypes, Omdurman, P. L. G. Benoit, July, 1964 (MRAC 127.155).

ETYMOLOGY. Specific name derived from the country of distribution.

DIAGNOSIS. The male of *O. sudan* sp.n. can be recognized by the male palp having the cymbiobulbus almost as large as patella and bulbal fenestra close to the tip of the of the cymbiobulbus (Figs 98–99). The female is characterized by having a narrow scutal ridge with a small median transparent circle and very narrow postgynal depression (Fig. 100).

DESCRIPTION. Apparently somewhat bleached specimens pale orange with pale yellow appendages except male palps pale orange. Eyes relatively large, anterior and median eyes of equal size, lateral ones ca. half of their diameter (Fig. 101). Scutiopetiole apparatus well developed (Fig. 102). Operculae relatively small, oval shaped (Fig. 102). Petiolar lobes fairly large, pointed (Fig. 102). Scutal cove ends close to the edge of ventral scutum. Palpal patella slightly shorter than cymbiobulbus (ratio 0.9), and about 1.5 longer than palpal femur (Fig. 98). Patellar length/width ratio 1.5. Postgynum without parmula (Fig. 100).

MEASUREMENTS. Male: TL 1.37, CL 0.57, CW 0.45, DSL 0.80, DSW 0.50, TiI 0.21, CI 0.78, DSI 0.62, CSI 0.71, LLI 0.38. Female: TL 1.50, CL 0.62, CW 0.48, DSL 0.96, DSW 0.61, TiI 0.25, CI 0.77, DSI 0.63, CSI 0.65, LLI 0.40.

DISTRIBUTION. Sudan.

Opopaea suspecta Saaristo, 2002

Figs 103–106.

O. s. Saaristo, 2002: 20, f. 55–58 (D ♀).

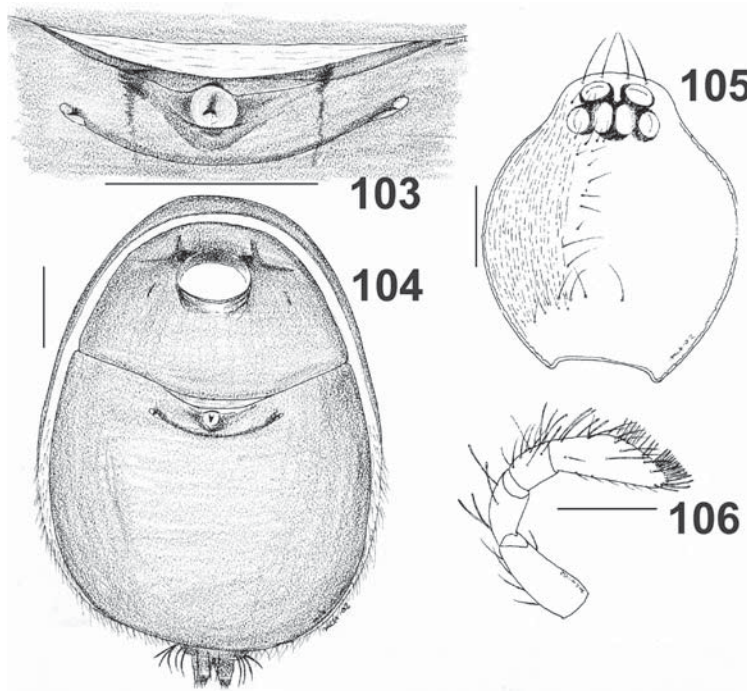
MATERIAL. SEYCHELLES: Holotype ♀ from Praslin, Valle de Mai, 19.03.2002, J. Gerlach leg. (MZT AA 2.298).

DIAGNOSIS. Female (male unknown) of *O. suspecta* can be recognized by having thick, erect hairs on female palpal tibia (Fig. 106) and behind the epigastric furrow a round depression with a short, spiny extension at its middle (Fig. 103). In comparison to other African *Opopaea* spp. it is one of the largest species.

DESCRIPTION. Female (male unknown). Medium-sized (TL = 1.61, CL = 0.71), completely chitinized species. Cephalothorax and abdomen brown, legs pale yellowish. Carapace dorsally smooth, sides with numerous longitudinal striae. Four long hairs standing on clypeus; on either sides of the upper surface of carapace some ten hairs in irregular rows and some ten hairs in a transverse row on posterior part of carapace. Eyes almost equal in size (Fig. 105). Apical half of tarsus with numerous, erect thick hairs (Fig. 106); similarly thickened hairs also on other palpal segments and legs. Operculae small, slit-like (Fig. 104). Dorsolateral corners of petiolar tube with triangular lobes opposed with boomerang-shaped ridges on epigastric scutum. Hairs on anal ring conspicuously thickened (Fig. 104). On posterior side of epigastric furrow a light, roundish depression with a dark, claw-like median elevation (Fig. 104).

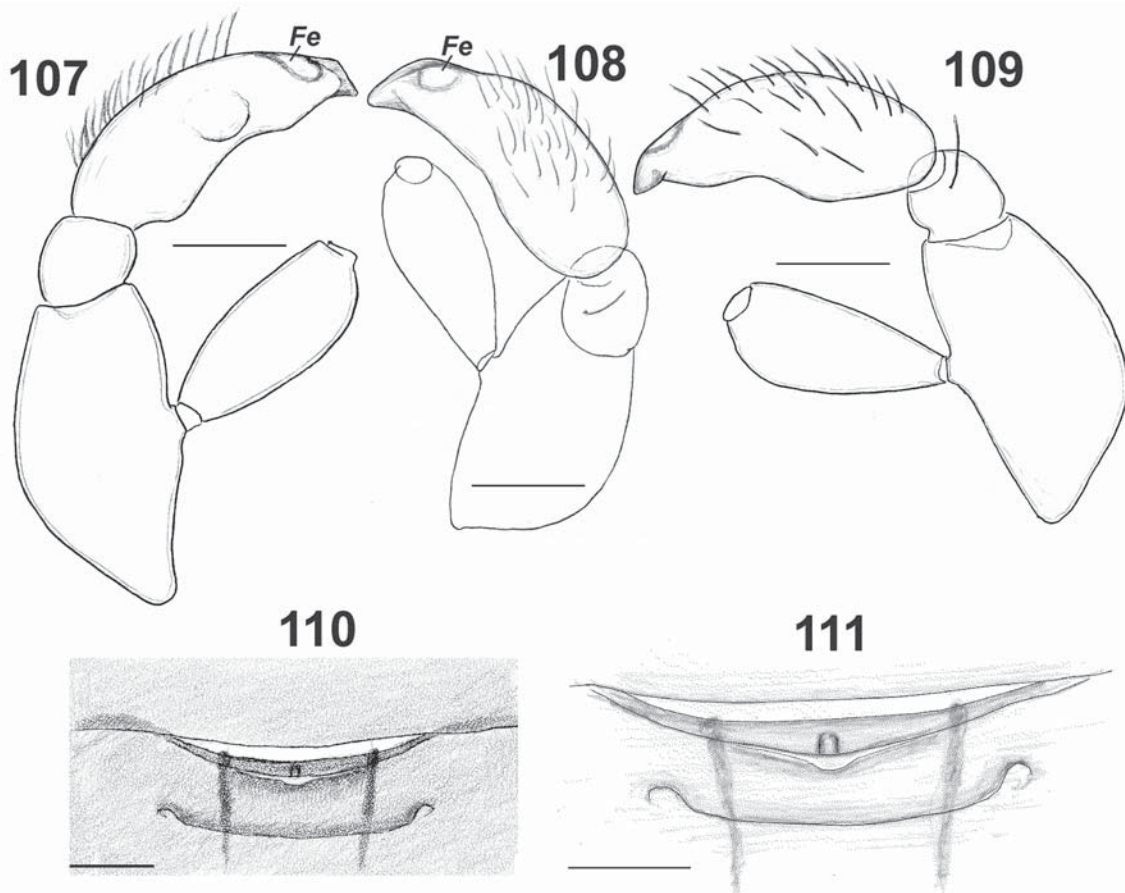
DISCUSSION. This species is assigned to *Opopaea* with some hesitation. The structure on the posterior side of epigastric furrow resembles that of *Opopaea silhouettei* (Benoit, 1979) and also the triangular lobes on petiolar tube are typical for the genus *Opopaea*. On the other hand, the form of operculae, presence of thickened hairs and large size are all typical for *Lisna trichinalis* (Benoit, 1979). Finding the male is essential for the proper generic placement of the species.

DISTRIBUTION. Praslin, Seychelles.



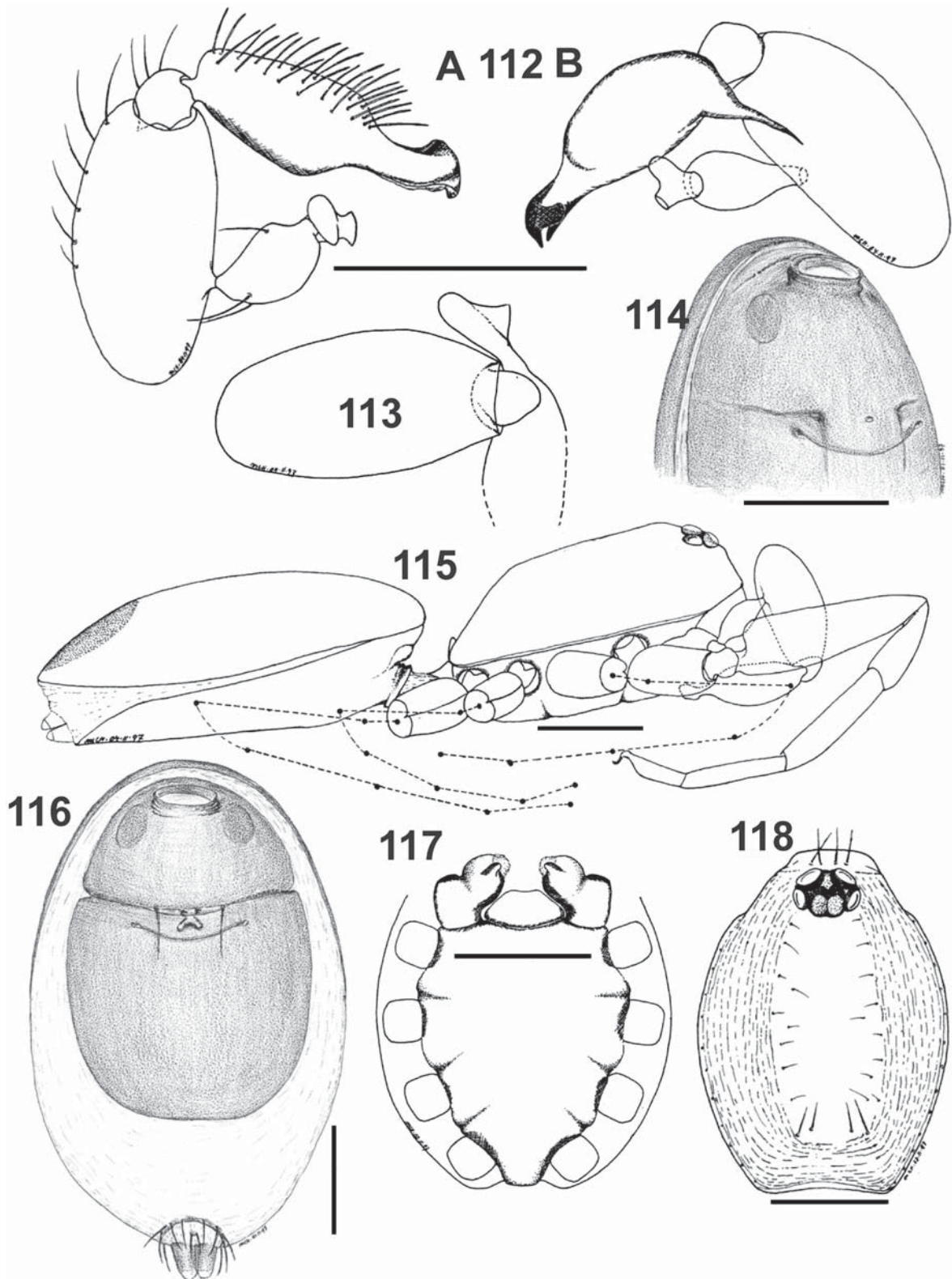
Figs 103–106. *Opopaea suspecta* Saaristo, 2003: 103 — postgynum, ventral; 104 — abdomen of female, ventral; 105 — carapace, dorsal; 106 — right female palp, lateral. Scale bars: 0.2 mm. Orig.

Рис. 103–106. *Opopaea suspecta* Saaristo, 2003: 103 — постгинум, снизу; 104 — брюшко самки, снизу; 105 — карапакс, сверху; 106 — пальпа самки, сбоку. Масштаб: 0,2 мм. Ориг.



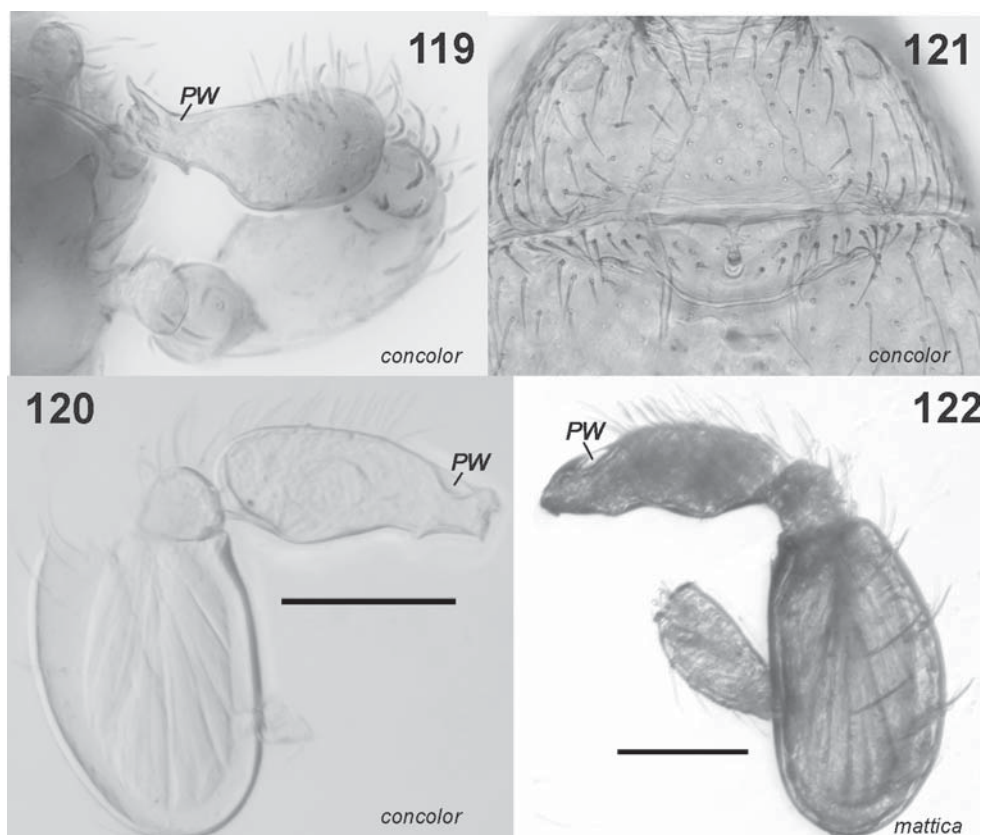
Figs 107–111. *Opopaea gaborone* sp.n.: 107 — male palp, retrolateral; 108 — male palp, dorsal; 109 — male palp, prolateral; 110–111 — postgynum, ventral. Scale bars: 0.1 mm. Orig.

Рис. 107–111. *Opopaea gaborone* sp.n.: 107 — пальпус самца, ретролатерально; 108 — пальпус самца, сверху; 109 — пальпус самца, пролатерально; 110–111 — постгинум, снизу. Масштаб: 0,1 мм. Ориг.



Figs 112–118. *Nale lena*: 112 — male palp retro- (A) and pro-lateral (B); 113 — proximal part of cymbiobulbus, tibia and patella showing outgrowth of cymbiobulbus; 114 — anterior part of male abdomen obliquely ventral; 115 — male, lateral; 116 — female abdomen, ventral; 117 — endites and sternum of male, ventral; 118 — male carapace, dorsal. Scale bars: 0.2 mm. Orig.

Рис. 112–118. *Nale lena*: 112 — палец самца ретро- (А) и пролатерально (В); 113 — цимбиобульбус, голень и колено, показан вырост цимбиобульбуса; 114 — передняя часть брюшка самца; 115 — самец, сбоку; 116 — самка, снизу; 117 — тазики и стернум самца, снизу; 118 — карапакс самца, сверху. Масштаб: 0,2 мм. Ориг.



Figs 119–122. Digital photographs of *Opopaea concolor* (119–121) and *O. mattica* (122, holotype): 119 — male palp, maxilla and chelicera, ventral; 120 — male palp, retrolateral, holotype of *O. atlantica*; 121 — frontal part of female abdomen, ventral; 122 — male palp, prolateral. Scale: 0.1 mm.

Рис. 119–122. *Opopaea concolor* (119–121) и *O. mattica* (122, голотип): 119 — палец самца, максилла и хелицера, снизу; 120 — палец самца, ретролатерально, голотип *O. atlantica*; 121 — брюшко самки, снизу; 122 — палец самца, пролатерально. Scale: 0,1 мм.

Genus *Nale* gen.n.

Type species *Opopaea lena* Suman, 1965.

DIAGNOSIS. The genus is close to *Opopaea* but differs significantly by the male cymbiobulbus which has a large posteriorly pointing posteromedian extension (Figs 112B, 113, 181, 183, 185), lack of fenestra and dark spot on dorsal abdominal scutum. Postgynum with unique triangle-shaped plate and lacks parmula (Figs 116, 176). Both sexes can be easily separated from *Opopaea* and other scutate Oonopidae by large dark spot on the posterior end of the dorsal abdominal scutum (Fig. 115). Further scutopetiole apparatus and posterior sluice are much reduced compared to *Opopaea*, and legs are clearly longer. *Nale lena* has more stridulating ridges than *Opopaea* (Fig. 173) and more (about 20) lateral longitudinal ridges on carapace.

COMMENTS. It seems that extension of cymbiobulbus belongs to the bulbal part because it lacks any setae which are associated with cymbium only. *Nale lena* was removed from *Opopaea* to a new genus because it lacks palpal fenestrae. Fenestrae are present in all *Opopaea* species and unknown in all other oonopids and therefore the absence of fenestrae can be considered as plesiomorphic character. If fenestrae were to be present in *N. lena*, it should be treated

in *Opopaea*, because the probasal outgrowth of cymbiobulbus and the abdominal pattern are probably autapomorphic characters.

COMPOSITION. Type species only.

Nale lena (Suman, 1965)

Figs 112–118, 174–177, 179–185, 197, 201, 215, 229.

Opopaea lena Suman, 1965: 227, f. 9–14 (D ♂ & ♀).

Gamasomorpha ladigui Benoit, 1979: 198, f. 4A–D (D ♂ & ♀).

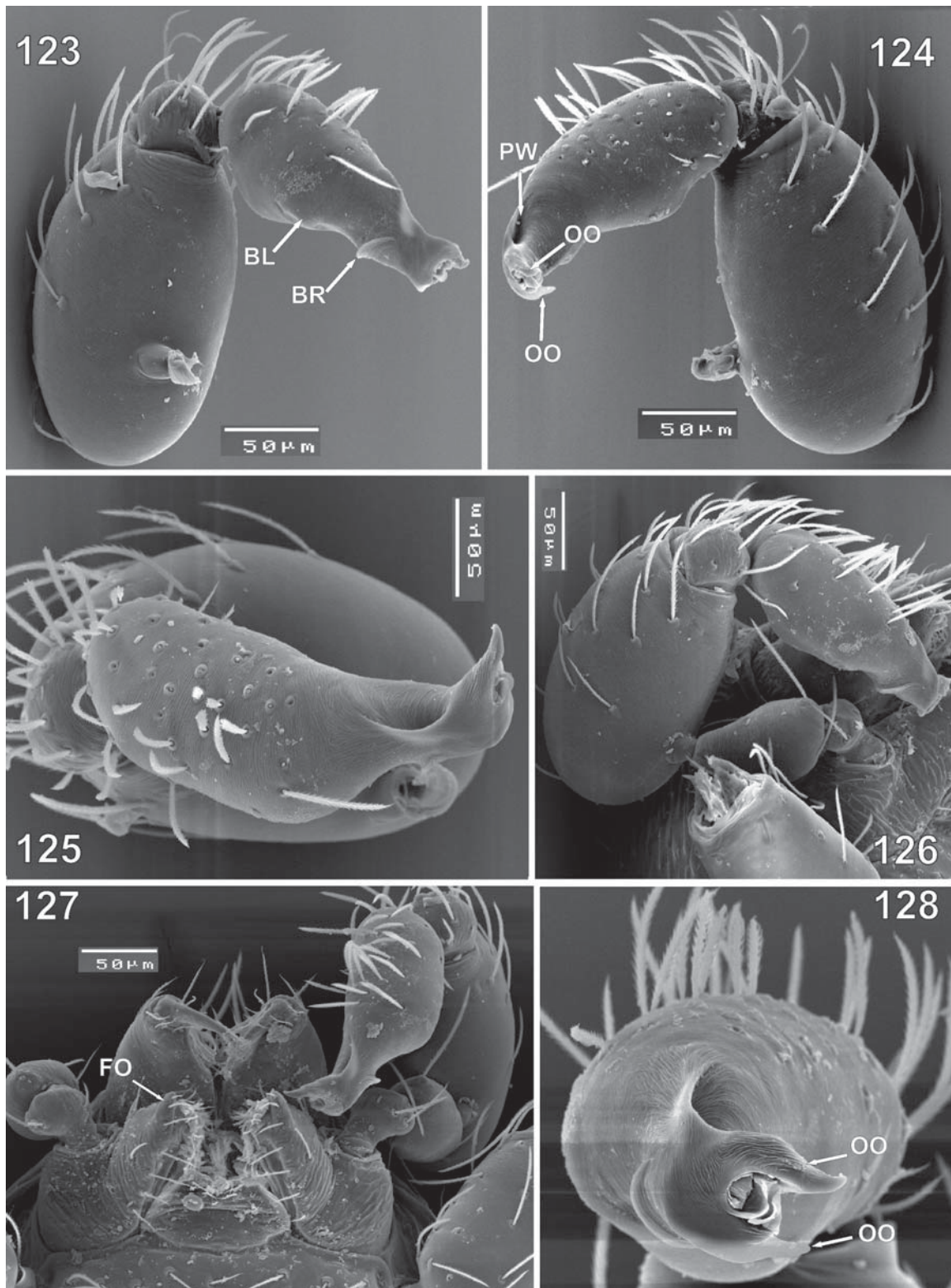
Opopaea mortenseni Brignoli, 1980: 6, f. 3 (D ♀).

Opopaea lena: Saaristo, 2001: 337, f. 112A–C, 113–117 (♂ & ♀, S).

Opopaea lena: Burger et al., 2003: 90, f. 23 (♀).

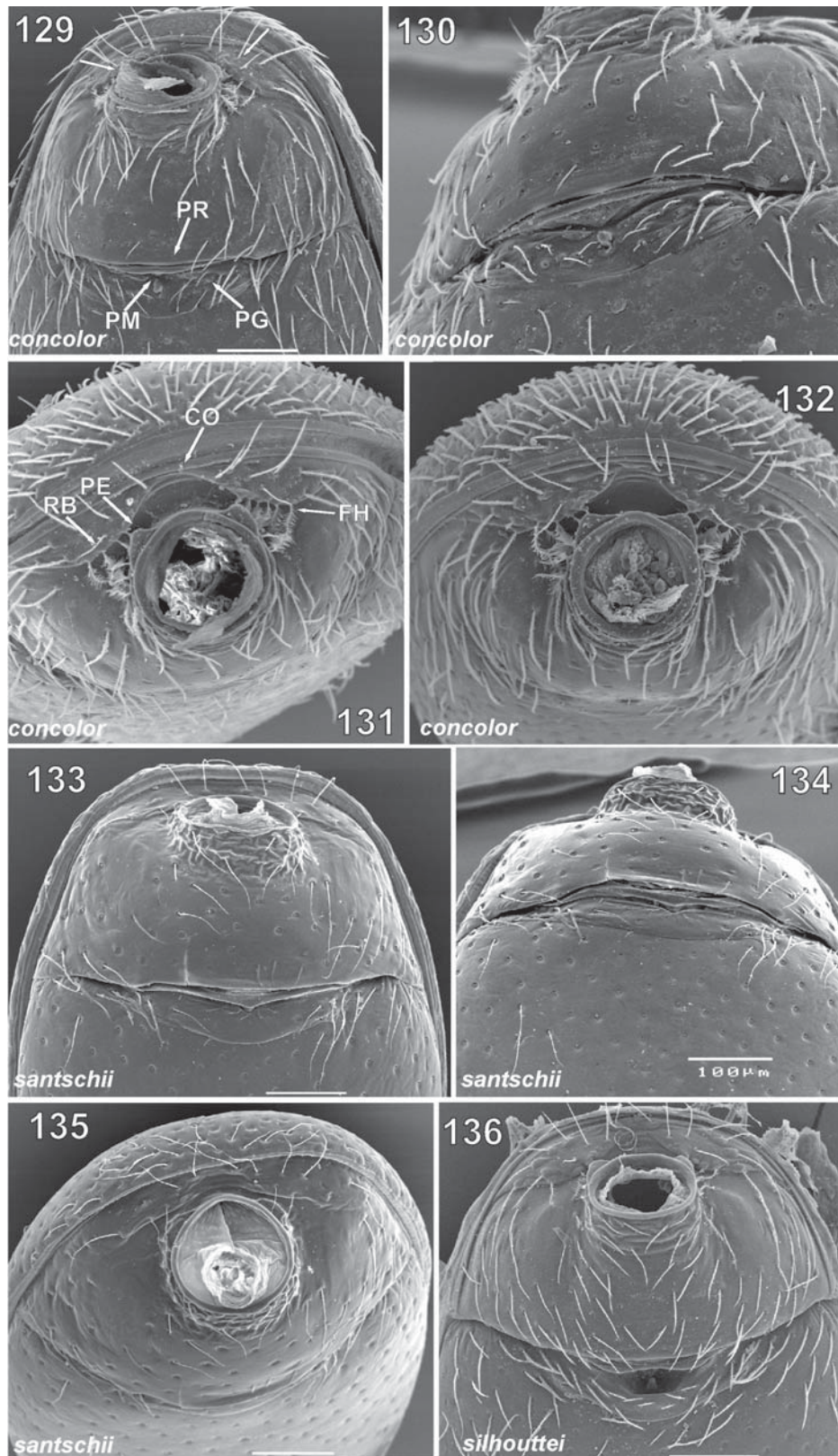
MATERIAL. HAWAII: 2 ♂♂, 1 ♀, Hawaii Isl., Hawaii Co., Kau Dist., route 11; mm 61, ginger litter in cemetery, 6.II.1997, J. & E. Berry. SEYCHELLES: 1 ♂, 1 ♀, Silhouette, La Passe, near water tanks, under bark of fallen coconut tree + rotten wood, 19.I.1999, M.I. Saaristo (MZT AA 1.148); 1 ♂, Silhouette Isl., near La Passe, 22.–25.VIII.1984 USSR Zool. Exp.; 1 ♂, Praslin Isl., along road to & nearby Vallee-deMai, 29.VIII.1984 USSR Zool. Exp.

DIAGNOSIS. Same as for genus.



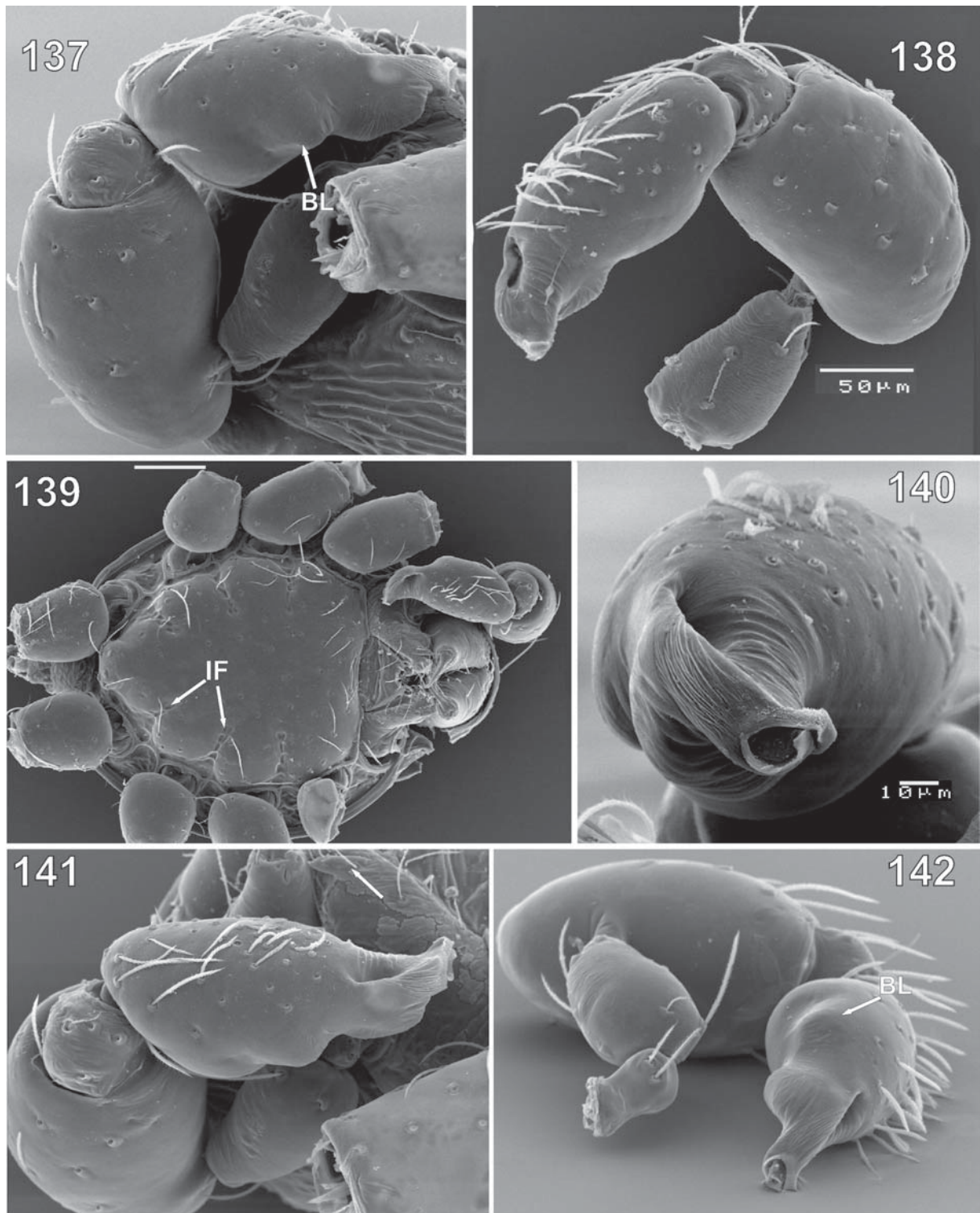
Figs 123–128. Male of *Oporea concolor* (from Cape Verde): 123–125 — palp, retrolateral, prolateral and from above, respectively; 126 — palp attached to carapace, retrolateral; 127 — terminal part of carapace, ventral; 128 — cymbiobulbus, frontal. Scale: 0.05 mm. Orig.

Рис. 123–128. Самец *Oporea concolor* (из Cape Verde): 123–125 — палец, ретролатерально, пролатерально и сверху, соответственно; 126 — палец присоединённый к головогрудь, ретролатерально; 127 — передняя часть карапакса, снизу; 128 — цимбиобульбус, спереди. Масштаб: 0,05 мм. Ориг.



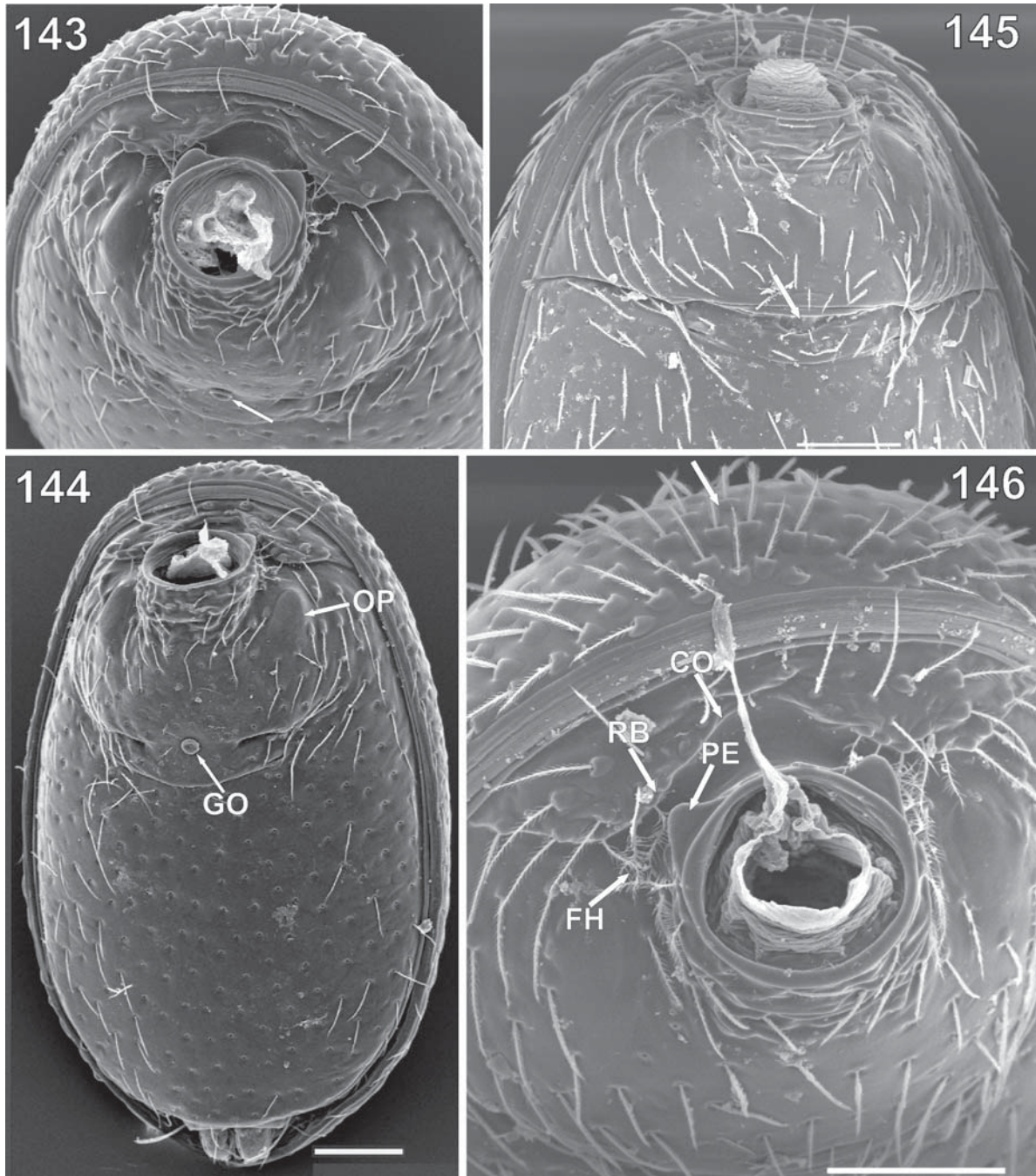
Figs 129–136. Abdomen of *Opopaea concolor* (from Cape Verde, 129–132), *O. santschii* (from Israel, 133–135) and *O. silhouttei* (136): 129–131, 133–136 — female, different aspects; 132 — male, terminal. Scale: 0.1 mm. Orig.

Рис. 129–136. Брюшко *Opopaea concolor* (из Cape Verde, 129–132), *O. santschii* (из Израиля, 133–135) и *O. silhouttei* (136): 129–131, 133–136 — самка, разные ракурсы; 132 — самец, спереди. Масштаб: 0,1 мм. Ориг.



Figs 137–142. Male of *Opopaea deserticola* (137–141 paratype of *O. atlantica* from St. Helene; 142 — from Marquesas Isles): 137–138 — palp, retrolateral and prolateral, respectively; 139 — male carapace, ventral; 140–141 — cymbiobulbus, frontal and dorsal, respectively; 141 — palp, frontal view. Scale: 0.1 mm if not otherwise indicated. Orig.

Рис. 137–142. Самец *Opopaea deserticola* (137–141 паратип *O. atlantica* из St. Helene; 142 — из Marquesas Isles): 137–138 — пальпус, ретролатерально и пролатерально; 139 — карапакс самца, снизу; 140–141 — цимбиобульбус, спереди и сверху, соответственно; 141 — пальпус, спереди. Масштаб: 0,1 мм если не указано иначе. Ориг.

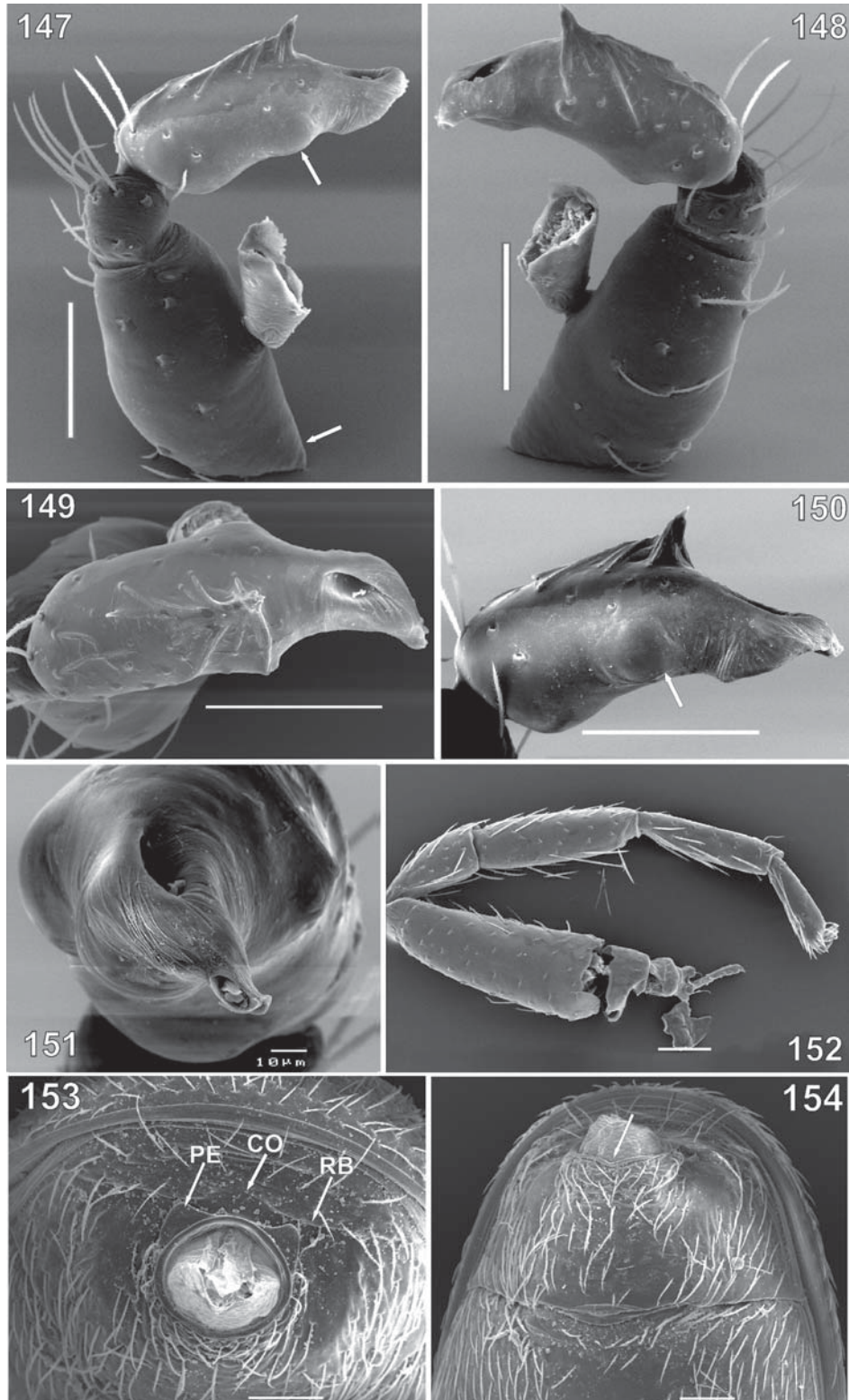


Figs 143–146. Abdomen of *Opopaea deserticola* (paratype male of *O. atlantica* from St. Helene; female — from Marquesas Isles): 143–144 — male abdomen, terminal and ventral, respectively; 145–146 — female abdomen, ventral and terminal, respectively. Scale: 0.1 mm. Orig.

Рис. 143–146. Брюшко *Opopaea deserticola* (паратип, самец *O. atlantica* из St. Helene; самка из Marquesas Isles): 143–144 — брюшко самца, спереди и снизу, соответственно; 145–146 — брюшко самки, снизу и спереди, соответственно. Масштаб: 0,1 мм. Ориг.

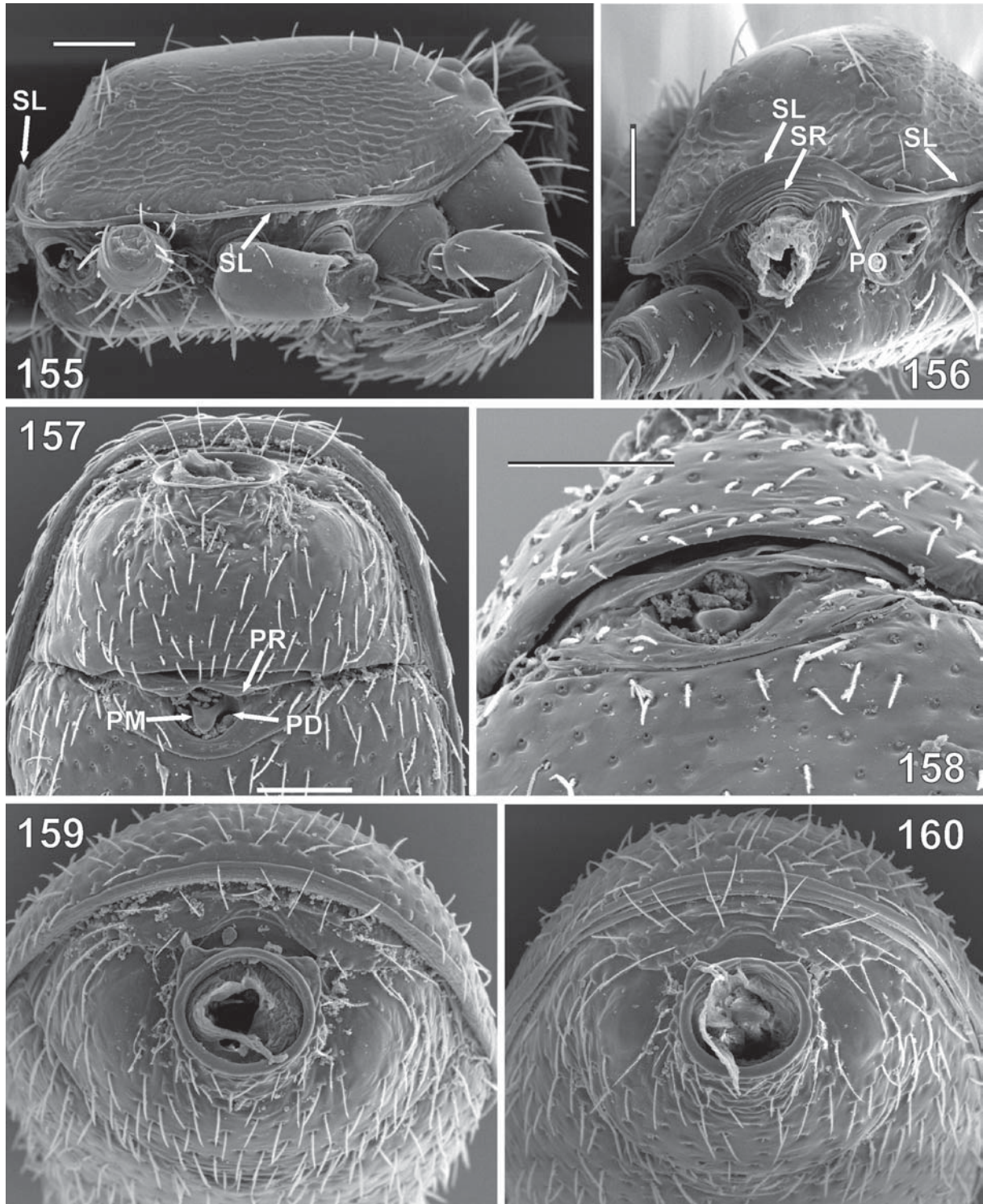
DESCRIPTION (based on specimens from Seychelles). TL = 1.19–1.26, CL = 0.53–0.56, general colouration light orange brown with large dark spot on posterior part of dorsal scutum. Legs pale yellow, male palps darker, about same colour as carapace. Carapace elongated, with fine

longitudinal striae on sides; dorsal plane smooth with some mesially pointing, rather long hairs at lateral edges and pair of up-standing macrosetae on posterior corners. Sternum with fairly weakly developed radial furrows. Eyes relatively small, arranged in circle. Dorsal scutum densely covered



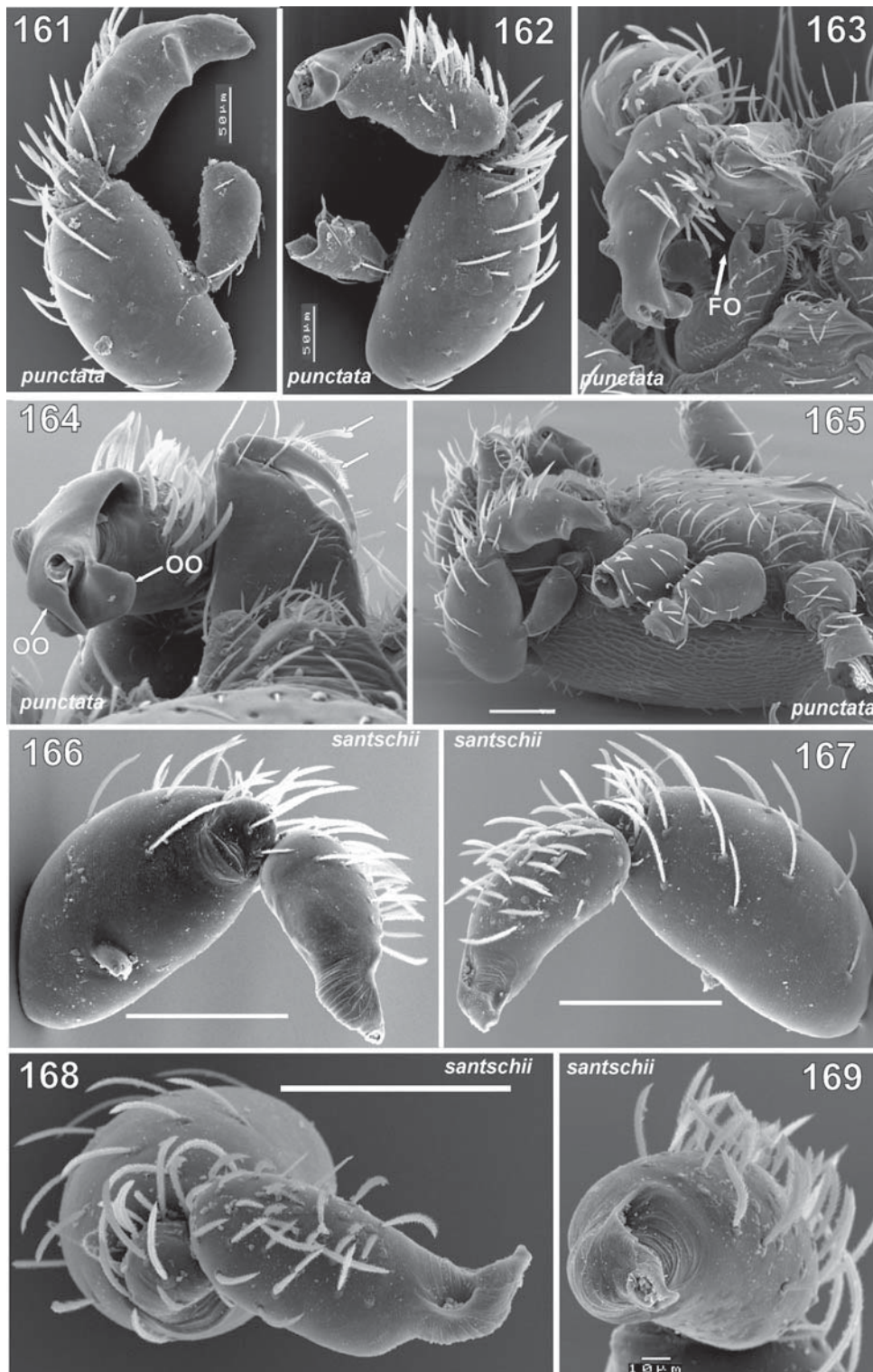
Figs 147–154. Paratypes of *Opopaea gaborone* sp.n.: 147–148 — male palp, retrolateral and prolateral, respectively; 149–151 — cymbiobulbus, dorsal, retrolateral and frontal, respectively; 152 — male leg I; 153–154 — female abdomen, terminal and ventral. Arrows showing bulbal lobe and conical posterior part of patella. Scale: 0.1 mm if not otherwise indicated. Orig.

Рис. 147–154. Паратипы *Opopaea gaborone* sp.n.: 147–148 — палец самца, ретролатерально и пролатерально, соответственно; 149–151 — цимбиобульбус, сверху, ретролатерально и спереди, соответственно; 152 — нога I самца; 27–28 — брюшко самки, спереди и снизу. Стрелки показывают выпуклую часть бульбуса и коническую форму колена. Масштаб: 0,1 мм если не указано иначе. Ориг.



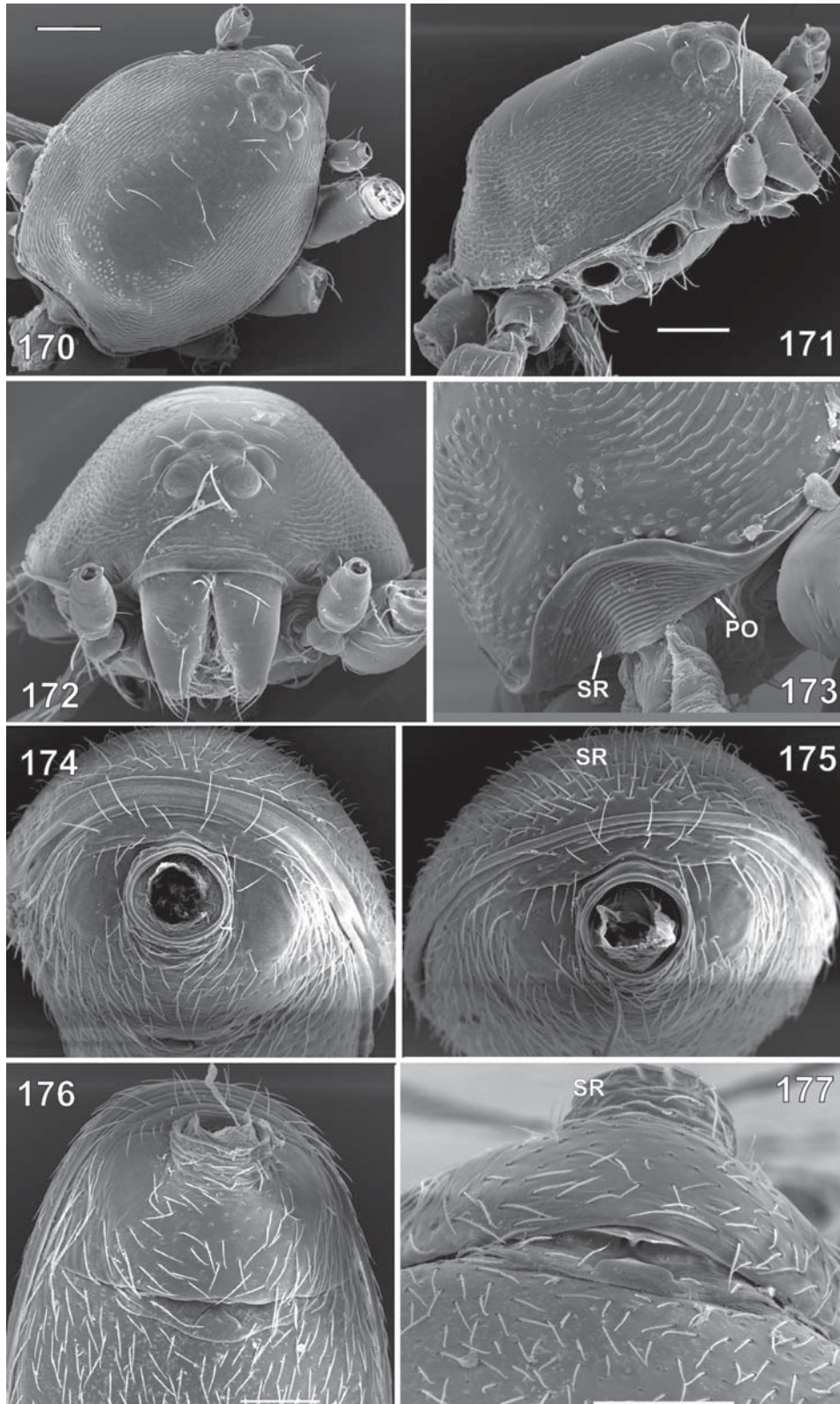
Figs 155–160. *Opopaea punctata* from Israel: 155–156 — female carapace, lateral and caudal, respectively; 157–159 — female abdomen, ventral, ventro-caudal, and terminal, respectively; 160 — male abdomen, terminal. Scale: 0.1 mm. Orig.

Рис. 155–160. *Opopaea punctata* из Израиля: 155–156 — карапакс самки, сбоку и сзади, соответственно; 157–159 — брюшко самки, снизу, снизу сзади и спереди, соответственно; 160 — брюшко самца, спереди. Масштаб: 0,1 мм. Ориг.



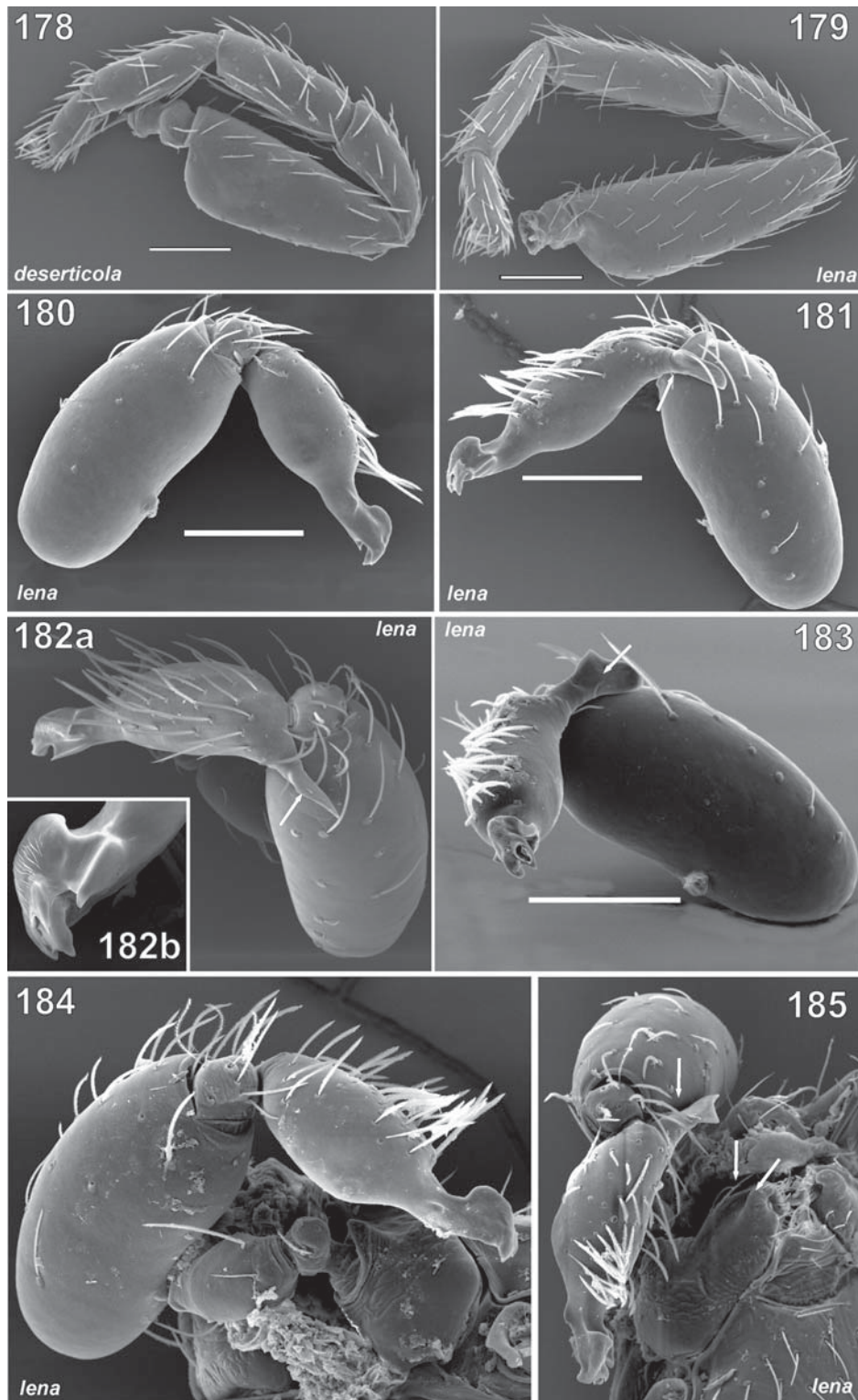
Figs 161–169. Male of *Opopaea punctata* (161–165) and *O. santschii* (166–169), both from Israel: 161–162, 166–167 — palp, retrolateral and prolateral, respectively; 163, 168 — terminal part of carapace, ventral; 164 — palp, chelicera and maxilla, caudal; 165 — carapace, lateral; 169 — male palp, terminal. Unnamed arrows show peculiar cheliceral hairs which are present in many Oonopidae. Scale: 0.1 mm if not otherwise indicated. Orig.

Рис. 161–169. Самец *Opopaea punctata* (161–165) и *O. santschii* (166–169), из Израиля: 161–162, 166–167 — пальпус, ретролатерально и пролатерально, соответственно; 163, 168 — передняя часть карапакса, снизу; 164 — пальпус, хелицера и максилла, сзади; 165 — карапакс, сбоку; 169 — пальпус самца, спереди. Стрелки показывают особые волоски хелицер, которые имеются у многих Оопориде. Масштаб: 0,1 мм если не указано иначе. Ориг.



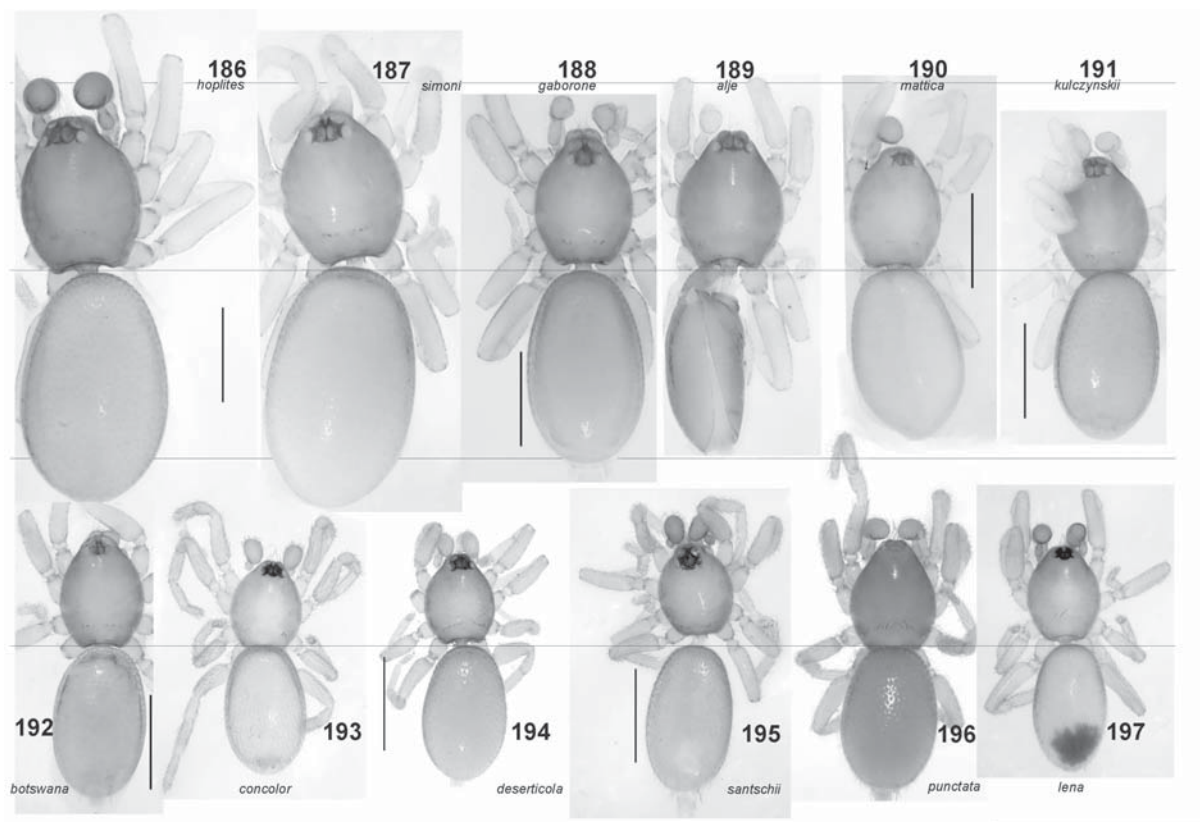
Figs 170–177. *Nale lena* male carapace (from Praslin Isl., Seychelles) and abdomen (from Hawaii Isl.): 170–172 — dorsal, lateral, frontal; 173 — caudal, shows stridulating ridges; 174–175 — abdomen frontal, female and male, respectively; 176–177 — female abdomen, ventral and ventro-caudal, respectively. Scale: 0.1 mm. Orig.

Рис. 170–177. *Nale lena* карапакс самца (из Praslin Isl., Seychelles) и брюшко (из Hawaii Isl.): 170–172 — сверху, сбоку, спереди; 173 — сзади, показаны стридуляционные бороздки; 174–175 — брюшко спереди, самка и самец, соответственно; 176–177 — брюшко самки, снизу и снизу-сзади, соответственно. Масштаб: 0,1 мм. Ориг.



Figs 178–185. *Opopaea deserticola* (178, from Marquesas Isles) and *Nale lena* (180–181, 183, from Praslin Isl., Seychelles; 192, from Hawaii Isl.; 184–185, from Silhouette Isl., Seychelles): 178–179 — male leg I; 180, 184 — palp retrolateral; 181 — palp, prolateral; 182a — palp, from above; 182b — palp, frontal; 183 — palp, terminal; 185 — palp and maxilla, ventral. Arrow showing extension of cymbiobulbus. Scale: 0.1 mm. Orig.

Рис. 178–185. *Opopaea deserticola* (178, из Marquesas Isles) и *Nale lena* (180–181, 183, из Praslin Isl., Seychelles; 192, из Hawaii Isl.; 184–185, из Silhouette Isl., Seychelles): 178–179 — нога I самца; 180, 184 — пальпус ретролатерально; 181 — пальпус, пролатерально; 182a — пальпус, сверху; 182b — пальпус, спереди; 183 — пальпус, спереди; 185 — пальпус и максилла, снизу. Стрелки показывают вырост цимбиобульбуса. Масштаб: 0,1 мм. Ориг.



Figs 186–197. Habitus of males of *Opopaea hoplites* (186), *O. simoni* (187), *O. gaborone* sp.n. (188), *O. alje* sp.n. (189), *O. mattica* (190), *O. kulczynskii* (191), *O. botswana* sp.n. (192), *O. concolor* (193), *O. deserticola* (194), *O. santschii* (195), *O. punctata* (196) and *Nale lena* (197), dorsal, distance between horizontal lines: 1 mm. Scale: 0.5 mm.

Рис. 186–197. Габитус самцов *Opopaea hoplites* (186), *O. simoni* (187), *O. gaborone* sp.n. (188), *O. alje* sp.n. (189), *O. mattica* (190), *O. kulczynskii* (191), *O. botswana* sp.n. (192), *O. concolor* (193), *O. deserticola* (194), *O. santschii* (195), *O. punctata* (196) и *Nale lena* (197), сверху. Расстояние между горизонтальными линиями: 1 мм. Масштаб: 0,5 мм.

with short, subdecumbent hairs arising from small pits. Opercula relatively large, oval shaped (Figs 114, 116, 174–176); $OI = 0.71$. Scutopetiolear apparatus is fairly poorly developed (Figs 174–175), ridges of ventral scutum form almost a straight line, median arch is almost absent, extensions of petiolear tube very thin. Dorsal abdominal scutum with dark spot in posterior 1/3 (Figs 116, 197, 215). Other indexes: $CI = 0.77–0.75$, $DSI = 0.60–0.67$, $LLI = 0.40–0.38$, $CSI = 0.75–0.76$.

COMMENTS. We compared by the mean of the scanning electron microscope specimens collected on Hawaii and Seychelles and found no differences in somatic morphology or in the shape of genitalia. This proves that while some species of Oonopidae have wide ranges they do not show tendency to speciation on isolated islands.

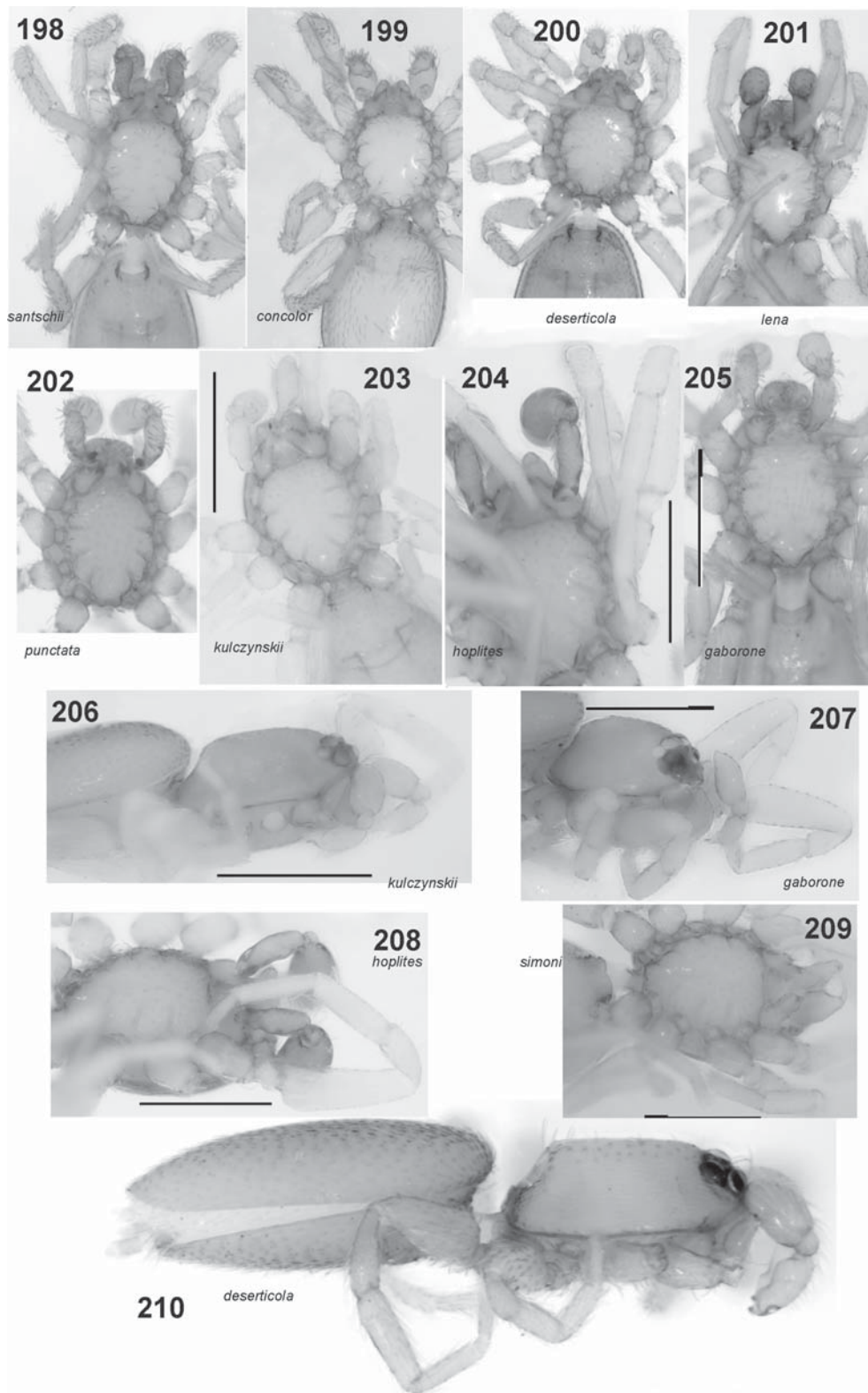
DISTRIBUTION. Thailand, Seychelles, Hawaii.

Discussion

Although we studied chiefly material and species occurring on islands, and only a few mainland African specimens (mostly types of species described earlier) it became evident that species diversity of *Opopaea* in Africa should be fairly large. Some of species occurring in Africa and adjacent islands have wide Pantropi-

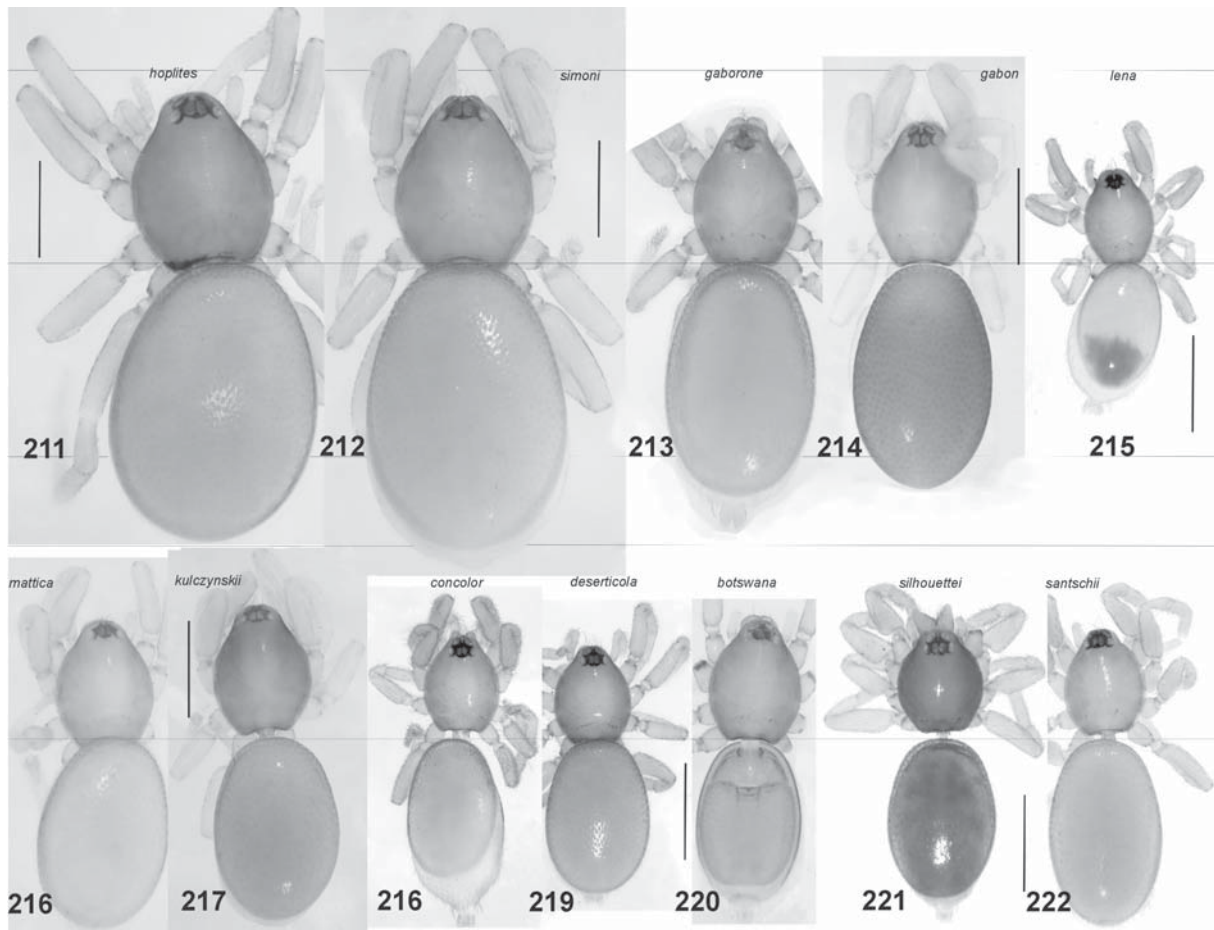
cal (*O. deserticola*) or Indo-Pacific ranges (*Nale lena*). Other species have smaller ranges and occur throughout whole of Africa and nearby territories such as Mediterranean islands, Arabian Peninsula or Near East (*O. santschii*, *O. simoni*). Few species are known exclusively from islands (*O. probosciella*, *O. silhouettei*, *O. suspecta*). Reasonably many species, newly described and old are known from a single locality (*O. alje* sp.n., *O. berlandi*, *O. gabon* sp.n., etc.). Because of a lack of information about *Opopaea* from many parts of Africa (none of species are known from West Africa, Central Africa and Madagascar we can not predict (estimate) what part of African continent and adjacent islands has the most specious fauna of *Opopaea*. The only known species of oonopid species from Madagascar was found in recent resins (copal) [Wunderlich, 2004].

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Figs 198–210. Males of *Opopaea santschii* (198), *O. concolor* (199), *O. deserticola* (200, 210), *Nale lena* (201), *O. punctata* (202), *Opopaea kulczynskii* (203, 206), *O. hoplites* (204, 208), *O. gaborone* sp.n. (205, 207) and *O. simonii* (209): 198–205, 209 — ventral; 207 — fronto-lateral; 206, 210 — lateral; 208 — lateroventral. Scale: 0.5 mm. Orig.

Рис. 198–210. Самцы *Opopaea santschii* (198), *O. concolor* (199), *O. deserticola* (200, 210), *Nale lena* (201), *O. punctata* (202), *Opopaea kulczynskii* (203, 206), *O. hoplites* (204, 208), *O. gaborone* sp.n. (205, 207) и *O. simonii* (209): 198–205, 209 — снизу; 207 — спереди-сбоку; 206, 210 — сбоку; 208 — сбоку-снизу. Масштаб: 0,5 мм. Ориг.



Figs 211–222. Habitus of females of *Opopaea hoplites* (211), *O. simoni* (212), *O. gaborone* sp.n. (213), *O. gabon* sp.n. (214), *Nale lena* (215), *Opopaea mattica* (216), *O. kulczynskii* (217), *O. concolor* (218), *O. deserticola* (219), *O. botswana* sp.n. (220), *O. silhouettei* (221) and *O. santschii* (222). Dorsal except abdomen in Fig.220. Distance between horizontal lines: 1 mm. Scale: 0.5 mm. Orig.

Рис. 211–222. Габитус самок *Opopaea hoplites* (211), *O. simoni* (212), *O. gaborone* sp.n. (213), *O. gabon* sp.n. (214), *Nale lena* (215), *Opopaea mattica* (216), *O. kulczynskii* (217), *O. concolor* (218), *O. deserticola* (219), *O. botswana* sp.n. (220), *O. silhouettei* (221) и *O. santschii* (222). Расстояние между горизонтальными линиями: 1 мм. Масштаб: 0,5 мм. Ориг.

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Figs 223–236. Ventral side of female abdomen in *Opopaea gabon* sp.n. (223), *O. gaborone* sp.n. (224), *O. suspecta* (225), *O. deserticola* (226), *O. punctata* (227), *O. concolor* (228), *Nale lena* (229), *O. silhouettei* (230), *O. botswana* sp.n. (231), *O. mattica* (232), *O. kulczynskii* (233), *O. simoni* (234), *O. hoplites* (235) and *O. santschii* (236). Distance between horizontal lines: 1 mm. Scale: 0.5 mm. Orig.

Рис. 223–236. брюшко самки снизу *Opopaea gabon* sp.n. (223), *O. gaborone* sp.n. (224), *O. suspecta* (225), *O. deserticola* (226), *O. punctata* (227), *O. concolor* (228), *Nale lena* (229), *O. silhouettei* (230), *O. botswana* sp.n. (231), *O. mattica* (232), *O. kulczynskii* (233), *O. simoni* (234), *O. hoplites* (235) и *O. santschii* (236). Расстояние между горизонтальными линиями: 1 мм. Масштаб: 0,5 мм. Ориг.

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